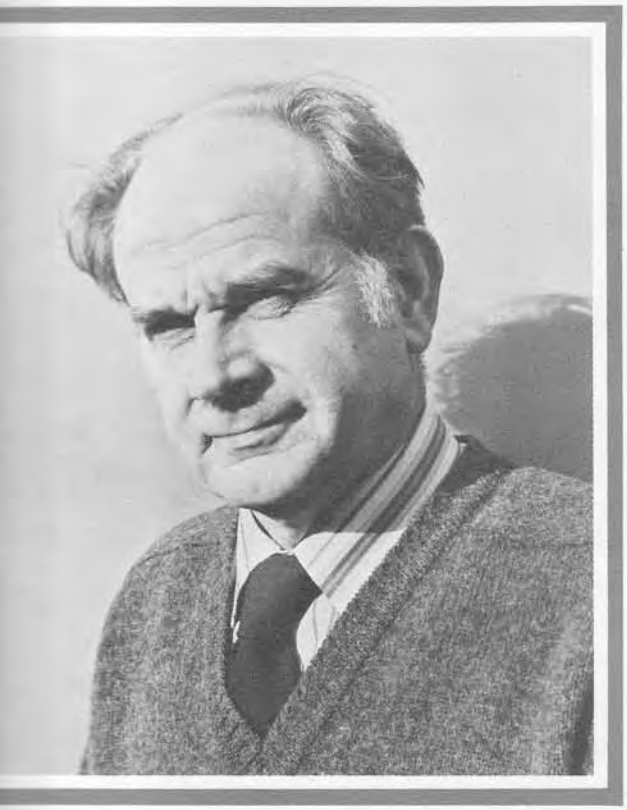
DEWALT®
POWERSHOP
HANDBOOK

How to make the most of your
RADIAL ARM SAW

DEWALT® POWERSHOP HANDBOOK

Black & Decker Professional Products Division, Cannon Lane, Maidenhead, Berks, SL6 3PD, England.



Editorial Consultant: Gordon Warr

Gordon Warr has been involved with most aspects of professional woodworking for nearly forty years.

Starting his working career with a woodworking contractor, he moved on to become a Building Surveyor, before later qualifying as a teacher.

In recent years, he has had nearly 400 articles published on the subject, many of which have appeared in Practical Woodworking magazine. He has also written a number of books and many of his original designs for toys and models appear in the catalogues of leading toy companies.

Having left teaching to concentrate on his professional woodworking interests, he has recently made a number of broadcasts for BBC radio.

PUBLISHER'S NOTE: As is the case with any progressive manufacturer, Black and Decker/DeWalt have a continuing programme of product development and improvement. It is therefore likely that some details in this handbook will become out-of-date.

For example, precisely how some of the optional attachments fit onto the basic machine may change as well as the detailed aspects of the Powershop adjustment procedures. The reader is therefore advised to follow primarily the instruction leaflet supplied with the machine or attachment to be sure of the correct assembly and methods of adjustment.

It is probable, however, that most of such details and certainly the broad principles discussed in the handbook will remain valid for products sold many years after the June 1984 original publication date.

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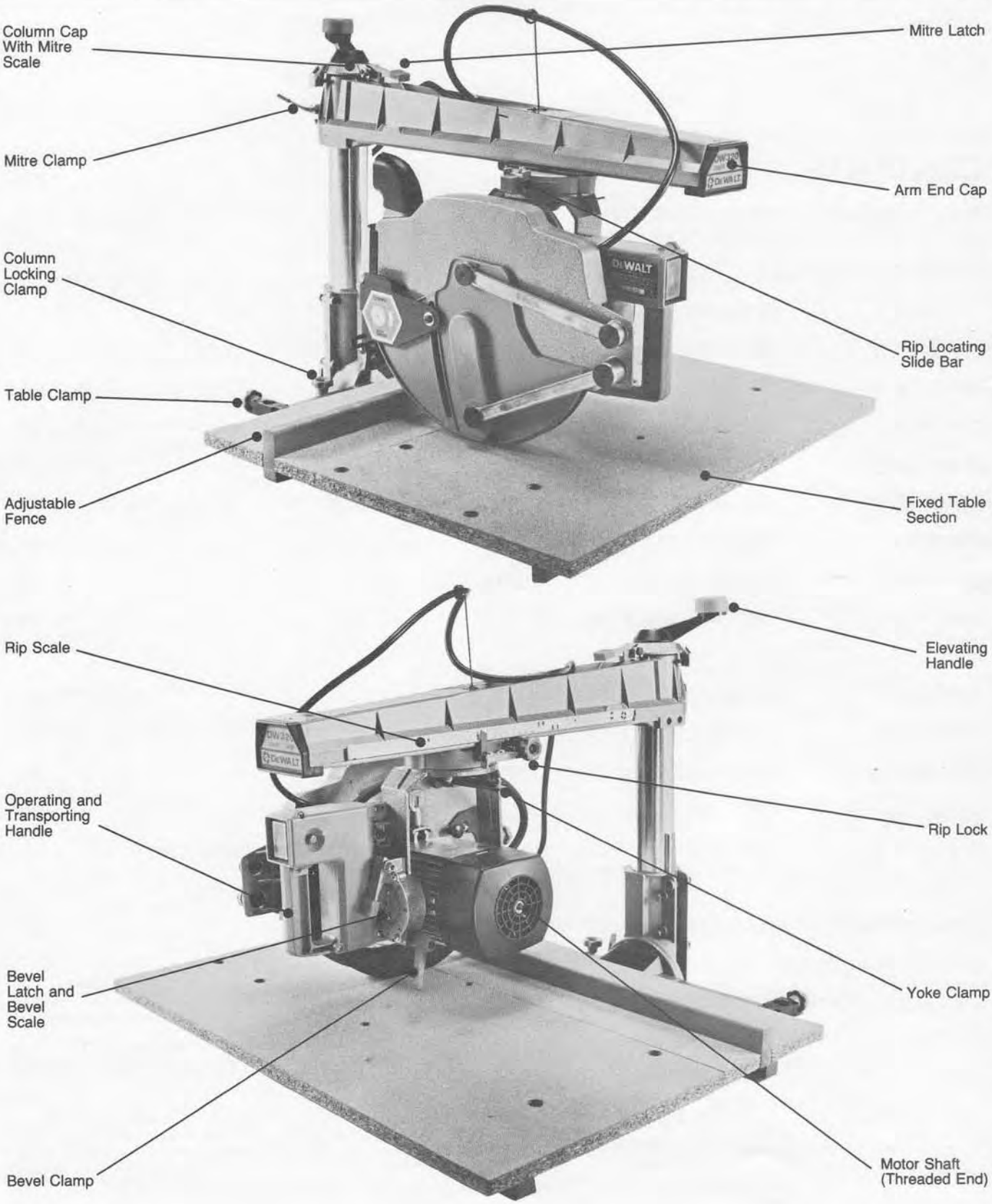
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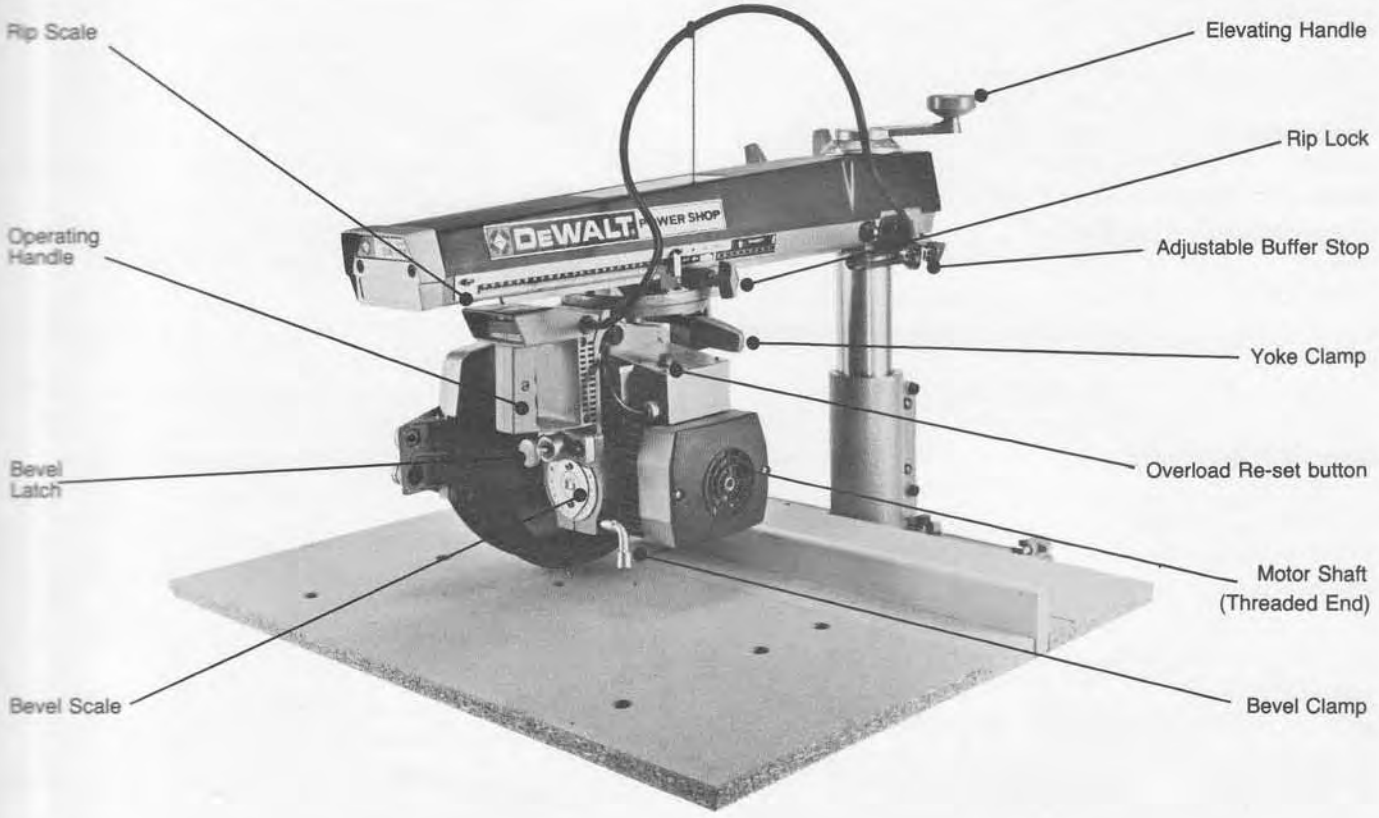
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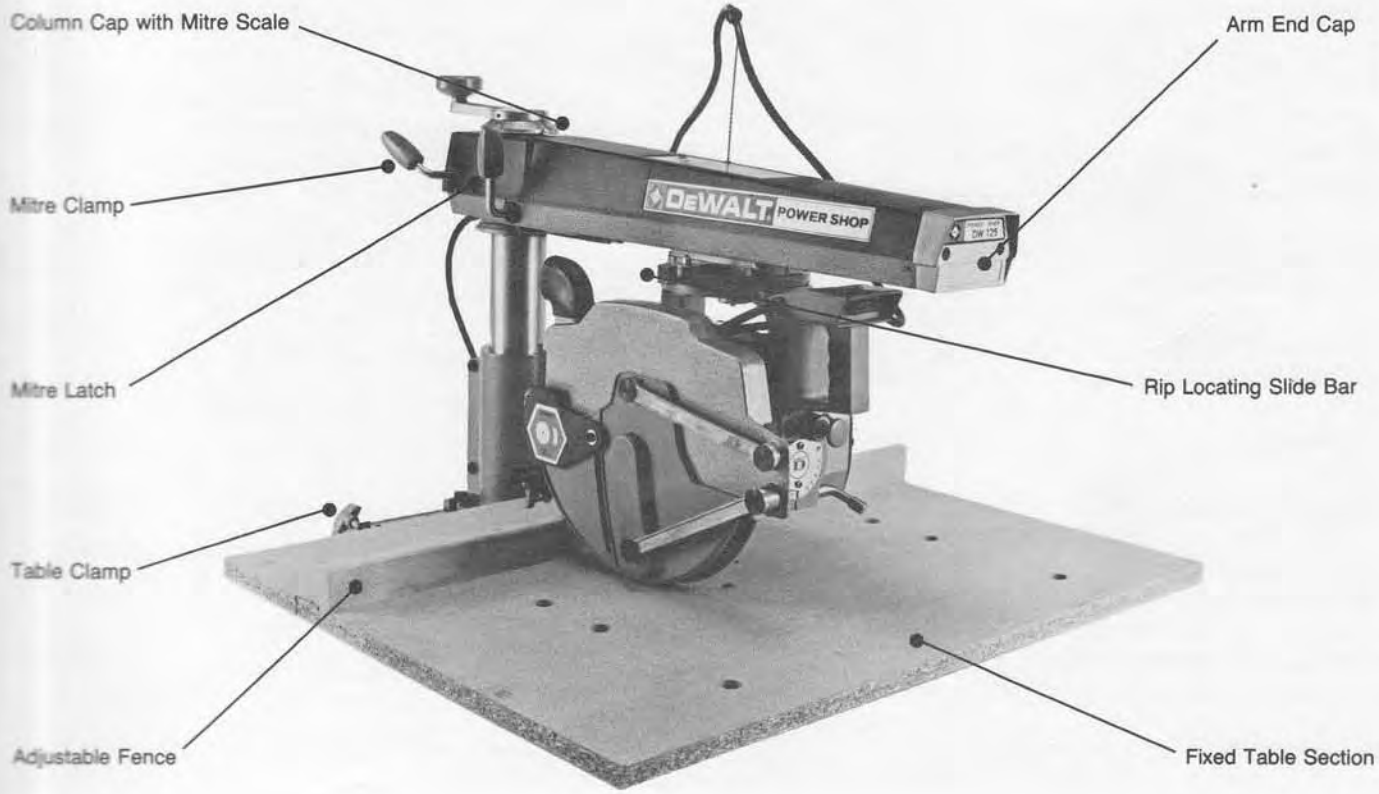
Column Cap with Mitre Scale
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Adjustable Fence
Fixed Table Section

GLOSSARY OF TERMS

Bevel. Slant or inclination of the blade, or cut, from the vertical position.

Climbing. The tendency for the saw blade to pull itself into the timber instead of cutting. Thus stalling the blade.

Compound Mitre. Cut obtained when sawblade set in a combined bevel/mitre position.

Contour Cutting. See cove cutting.

Cove Cutting. Cutting a hollow or concave moulding consisting of a quarter circle or ellipse.

Cross-Cutting. The sawing of wood across the grain.

Dado Head An adjustable-width grooving or channelling attachment.

Dish Cutting. The cutting of a dish-like shape in the surface of the timber with a saw blade.

Dovetail. A splayed shape cut in the form of a dove's tail.

Dovetail Taper. A length of wood used as a key which is tapered over its length, and on which the through section is cut into the shape of a Dovetail.

Dowel. A wood pin used for securing many types of joints.

Dowel Cutting. The cross-cutting of lengths of dowel.

Fence. A rest against which the material being worked is held steady.

Groove. A wide channel cut along the grain.

Housing. A trench or sinking in a piece of wood to receive another piece.

In-Rip. A positional setting for the motor to give the smallest rip capacity.

Jig. A guide for shaping the material mechanically on the machine. A fixture for holding difficult material.

Kerf. The cut made by the saw blade.

Lap Joint. A joint in which one piece overlaps the other.

Lattice. An open network, or trellis, formed of narrow strips crossing each other.

Mitre. The joining of two pieces of timber to form an angle.

Mitre Cut. The cutting of a piece of timber to form a mitre.

Mortise. A recess or hole made in a piece of wood to receive the end of another piece shaped to fit.

Moulding. The working of timber into various contours, and shapes by means of tools, such as the Shaping Head.

No-Load Speed. The number of revolutions per minute of the motor shaft when running without performing any operations.

Out-Rip. A positional setting of the motor to give maximum ripping capacity.

Panel Raising. Machining away a thin section of timber from the surface of a board around all sides, in order to give a raised panel effect to the centre of the board.

Pass. A single cut sequence of the blade. Several 'Passes' alongside each other will produce rebates, trenches or grooves.

Ploughing. The cutting of a wide groove.

Pointed Dowel. A dowel that has had one end sharpened to a point.

Push Stick. A piece of wood with a vee notch cut into it, and used in order to feed the timber through the blade when ripping.

Rebate or Rabbet. A recess, or step cut along the edge of a piece of timber.

Ripping. Sawing with, and along the grain.

Router Attachment. Bracket enabling portable router to be fitted to Powershop.

Sabre Saw. Attachment for curve-cutting or internal cuts.

Saucer Cutting. See Dish cutting.

Scalloping. Forming a decorative edge on material. Usually in the form of curves, convex or concave.

Set. The amount by which alternating sawblade teeth are out of alignment, in order to make a kerf wider than the actual blade thickness.

Shaping Head (or Moulding Block). Attachment for making profile shapes or mouldings on the side of a piece of wood.

Spline Joint. A simple joint that is locked together by the insertion of a key, or spline at a different angle to the joint.

Stop Block. A block of wood fastened to the table in order to ensure repeat operations, and to ensure no movement of material.

Stopped or Blind Housing. A housing that is not completed across the full width of the wood, but is finished short of one edge.

Stopped or Blind Dado. A stopped or blind housing that is made with a Dado Head.

T.C.T. Abbreviation for Tungsten Carbide Tipped, as on sawblades, router bits, drill bits, etc.

Tenon. The end of a piece of wood that has had the end section cut down to size in order to fit an appropriate mortise.

Tilt. The angle of incline of the motor from the vertical position.

Trench. A wide channel cut across the grain.

Yoke. The part of the machine in which the motor is suspended.

Chapter 1

Introduction

CHAPTER 1 INTRODUCTION

The most profound change in creative woodworking recently has been the increasing use of machinery. Few professional workshops are without them, and the keen amateur is increasingly following suit.

The advantages to the Professional are obvious. An increase in output, speed and accuracy for less physical effort makes perfect business sense. For the home craftsman however, a machine aid enables him to achieve twice as much in half the time. He is able to tackle larger and more ambitious projects, developing his skill and knowledge at the expense of routine physical chores.

The most common machine for cutting and fashioning wood is the saw bench type of circular saw. Most of these machines are fine, if a little limited in application. What lifts Dewalt Powershop radial arm saws into a higher class entirely, is the amazing variety of operations they can perform even in their standard form. A wonderfully wide and comprehensive assortment of optional attachments are also available, which can be fitted quickly and easily, and which dramatically extend the versatility of the basic machine.

Another vital consideration when choosing this kind of saw for workshop use is economy of space. The DeWalt is as compact as can be, and the Powershop 320 model has the added advantage that it can be folded and hung on a brick wall between jobs. (fig/A).


fig/A

The basic saw is extremely competitively priced, with the wide range of attachments purchased as extras depending on the nature of the work to be carried out. Obviously a toymaker, for instance, will have a different requirement from a cabinet maker. Special legs are available on which to mount your machine, though if you are especially cost conscious you can make your own.

A 13 amp power source is essential, and sound earthing of the yellow/green covered wire must be completed as the machine is not designed for two-wire working. Under no circumstances must the saw be connected to a lighting-only outlet.

Radial arm saws have undergone many refinements and additional functions since Raymond DeWalt introduced his first high quality machine in 1922. One aspect however has remained unaltered, namely the high degree of engineering ingenuity, the hallmark of DeWalt.

The secret of the Powershop success is the way in which the motor is mounted within a mobile yoke which can be swivelled both horizontally and vertically.

The horizontal movement allows the blade to operate when parallel to the fence, which is the position used for rip sawing. A built in plunger automatically engages for the saw's two principal positions, although a lever can be used to lock the yoke in any position. Intermediate angles are occasionally required for special cutting operations.

The angle of the motor's vertical movement within the yoke is fully adjustable, by plungers which automatically engage at 45° intervals. The blade itself can be readily positioned to any angle by the use of a calibrated scale and clamp lever.

What distinguishes the DeWalt from conventional circular saws is its radial arm. This can be raised or lowered by a handle enabling cuts of different depths to be made. In addition the arm can be swung to left or right and can be locked to 45° and will give a positive location when at 90°. A second clamp lever at the top of the main column confirms locking in these fixed positions, as well as any intermediate angles. A scale is incorporated to provide easy, instant setting to any angle.

FLEXIBILITY

The superior quality of the Powershop is immediately apparent in a number of ways. For example the way the saw can be adjusted, with positioning and locking of the arm and yoke effected with quick-acting levers and plungers. No spanners are required.

DeWalt design ingenuity shows in the way that minor adjustments can be made to maintain a constant high level of precision and all DeWalt saws are designed for maximum reliability and precision throughout their long lives.

Yet another feature which sets the Dewalt Powershop apart from run-of-the-mill machines lies in the way the blade is mounted directly on to the motor spindle. This eliminates the need for pulleys and belts and subsequent belt wear and slide. Efficiency is also increased because all motor power is delivered directly

to the blade or attachment.

However, a word of caution. Should the rate of feed be excessive - the blade is blunt or the wrong type – then the motor could be put under strain. **The Operator must therefore take care not to stall the motor, or if he does to switch power off immediately.**

The Powershop DW125 model is equipped with an overload protector button. Should overheating occur the red re-set button pops out to cut off the electricity supply. This button is on the top motor cover plate, and can only be depressed and re-engaged again when the motor has cooled down. This normally takes just a few minutes.

DELIVERY AND ASSEMBLY

To minimise the possibility of damage during transit. DeWalt machines are delivered part-assembled. Setting up and assembly are straightforward provided care is taken with proper sequences and checks. Most of the necessary tools are included and the setting-up procedure gives a new owner a chance to become familiar with his new machine. The chipboard worktable is in sections to allow flexible positioning of the fence. All parts will give long service under normal usage although it is true that table and fence do receive an additional amount of wear. However, they can easily be replaced.

SAFETY FIRST

DeWalt have always been ultra safety-conscious when designing their machines.

The saw blade is fully enclosed for more than half its diameter, with mobile guards on either side of the exposed part. These rise and fall over the work piece as it is being cut for optimum protection. To guarantee total control of the timber when it is being ripped, there is an adjustable riving knife plus an anti-kickback device incorporated into the guard. The optional attachments are equally well guarded where appropriate.

The on-off switch is situated within the handle moulding so that whilst your hand controls the movement of the yoke, no unnecessary movement is required to turn the machine either on or off. When making adjustments however, and particularly when changing blades and cutters, the machine must be completely isolated from the mains supply.

It must be said that even with extensive safety features there is always an element of danger with machinery. Common sense and basic ground rules must always be used by the operator.

FOR YOUR OWN SAFETY BE SURE TO FOLLOW THE SAFETY RULES IN APPENDIX 1. READ THEM AND FULLY UNDERSTAND THEM BEFORE STARTING TO WORK WITH YOUR OWN POWERSHOP

GETTING DOWN TO BASICS

Let us take a quick look at some of the basic sawing operations which can be executed on the Powershop, which are shown on fig 1/1. These include ripping of both narrow and wide material.

For such a comparatively small machine, its capacity is quite remarkable. Width of cutting allows a standard 4′×4′ halfsheet of man-made board to be sawn to any desired width. Your Powershop will carry out bevel and taper ripping, and bevelled taper sawing can be achieved by combining the two functions.

There are two variations on the saw's basic crosscutting facility: bevel cutting and mitre cutting. As before these two cuts can be made simultaneously to produce a compound mitre cut.

Fig 1/2 illustrates a further range of simple exercises. These limit the depth of cut which is made, and show a groove, a rebate and a trench.

(See Glossary of terms).

One of the great strengths of the DeWalt Powershop lies in making joints. Fig 1/3 shows how to form some of the common joints used in woodworking. Bear in mind that all the cuts made on the these sketches are done with the basic machine as supplied, using no more than a saw blade.

You will find with familiarity and experience an ever increasing number of new ways to use your machine for specialised cutting operations. As your skill grows so will the potential of your Powershop.

The name Powershop derives from the fact that the DeWalt Radial Arm Saw becomes a complete workshop when combined with the extensive range of optional attachments available. These attachments are discussed in detail in later chapters.

For trenching, grooving and other high precision jobs there are a variety of dado sets, or heads which are available in varying diameters. There are economy

sets made from standard, flat ground steel, and a better quality range with high speed tool steel tips.

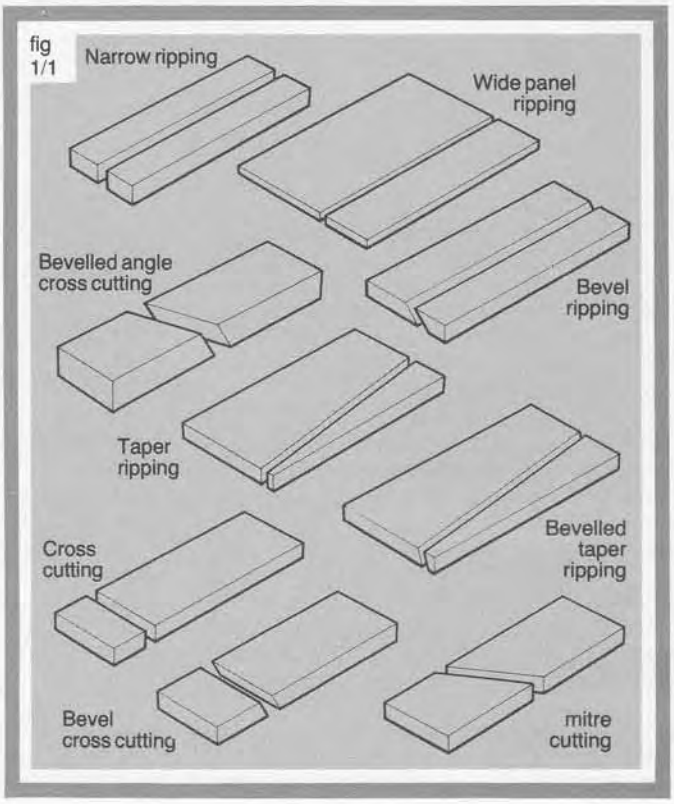
You can construct a virtually limitless assortment of profiles when the moulding block, or shaping head, is fitted. In addition tongues, grooving, chamfers and bevels can be made with the utmost ease and speed. With straight cutters in the block you have another method of forming rebates. Two sanders are provided to give that final smoothness to wood. The drum sander is ideal for smoothing concave or curved edges, and the large disc sander for trimming and general smoothing.

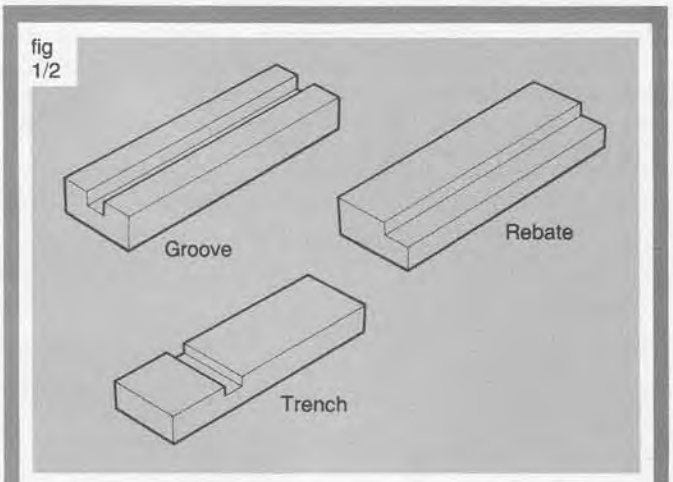
By simply adding a drill chuck to the saw you can perform a wide range of drilling tasks with far greater accuracy than a hand held power drill.

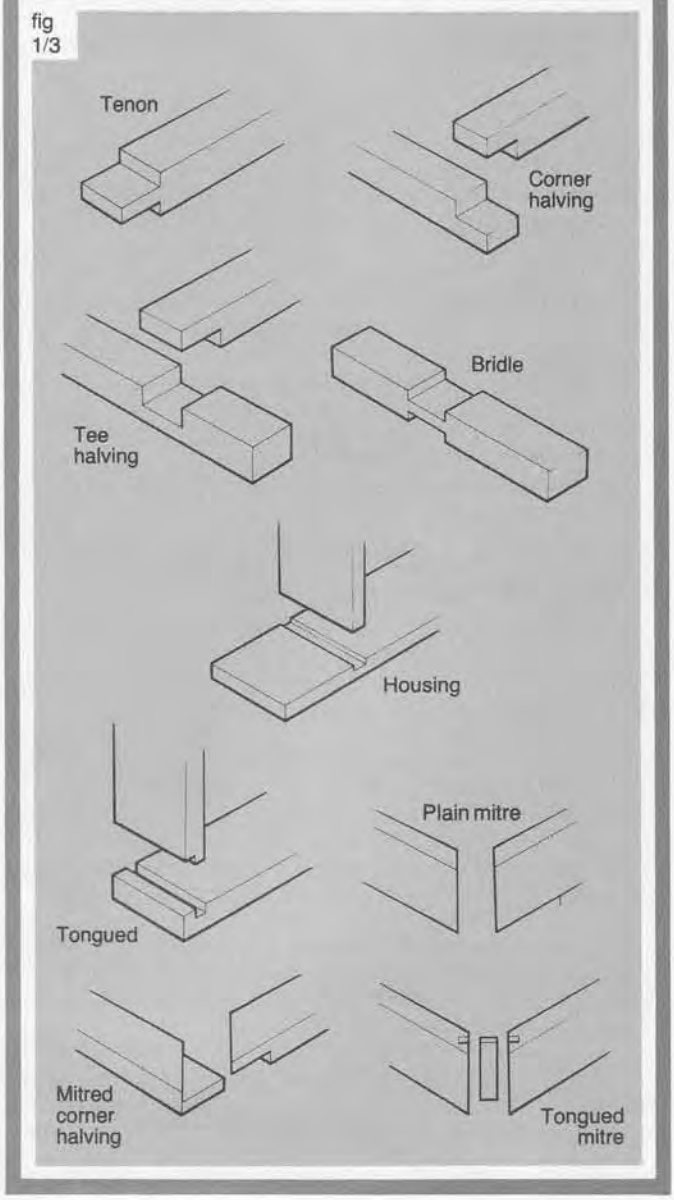
Normally a circular saw will only make straight cuts. However with a sabre saw attachment, curved cuts can be made externally or internally. Moreover straight sided internal cuts are needed from time to time, and here the sabre saw scores over even the bandsaw which cannot tackle any completely internal cut.

The DeWalt achieves a cleaner edge than the portable jigsaw by cutting with a downward stroke, particularly important with laminates or plywood.

It is also possible to add a host of useful facilities by combining your radial arm saw with a router, attached by special bracket to the yoke.







Chapter 2

Basic Cuts

CHAPTER 2

BASIC SAW CUTS

Before you attempt to saw, it is essential to understand the worktable arrangement. This comprises 4 elements as in fig. 2/1, a large fixed table which attaches to the front of the base frame, a wooden fence against which the worked material is held and two movable table strips which adjust the fence in relation to the saw blade. Thus varying types and depths of cut can be executed safely.

The four positions ABCD illustrated in fig. 2/2 are the ones appropriate to the various basic cuts, from 25mm in thickness up to the maximum cutting depth.

Your Powershop carries out the four fundamental cuts of a circular saw with ease and simplicity. These cuts are cross cut, mitre, bevel and rip. The following section explains how your Powershop performs these cuts. As you gain experience with the machine, the easier certain operations will become and the greater your versatility with it.

fig 2/1

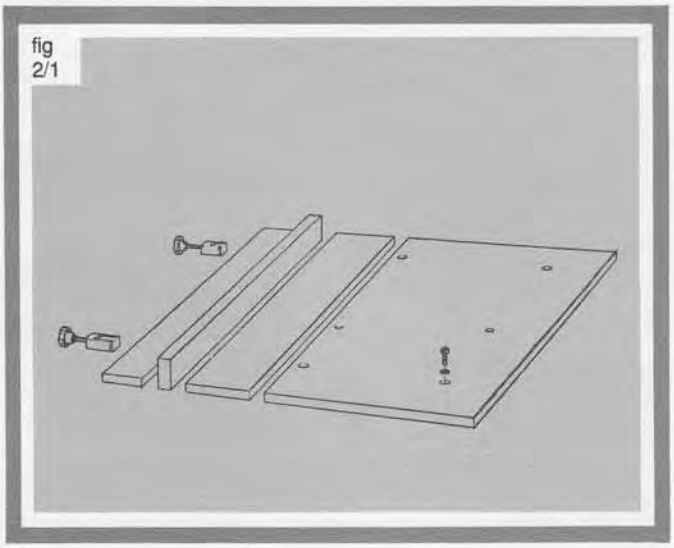
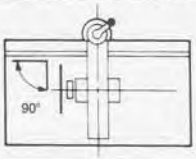
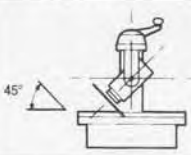
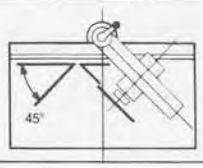
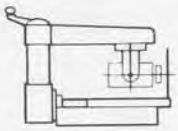
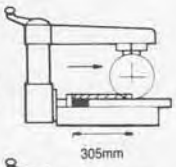
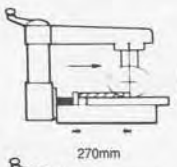
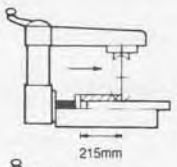
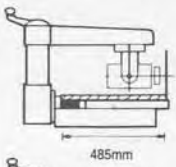
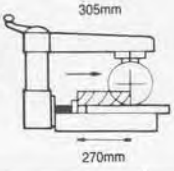
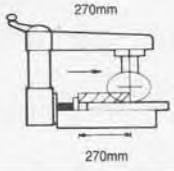
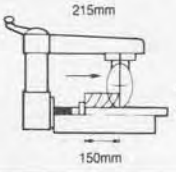
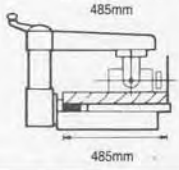
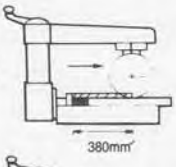
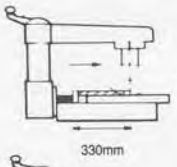
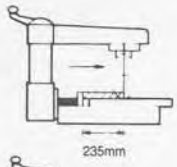
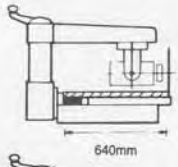
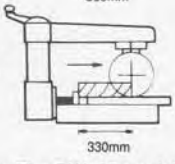
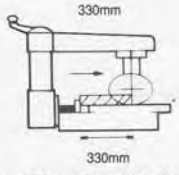
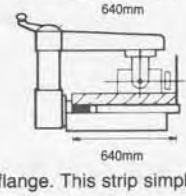
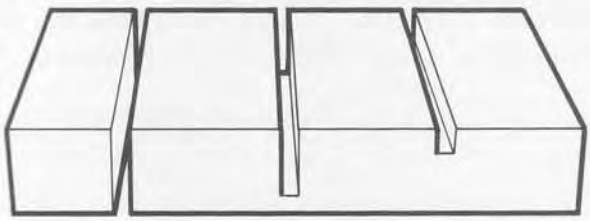


fig 2/2

	STRAIGHT CROSSCUT	45° BEVEL CROSSCUT	45° MITRE CUT	RIP CUT
				
DW 320 Max cutting width at this depth.				
Max cutting width at this depth.				
DW125 Max cutting width at this depth.				
Max cutting width at this depth.				

Note: The DW125 model has a third movable strip which has two holes in it for the rear central table adjusting flange. This strip simply moves backwards if the fence needs to be positioned in front of it, when horizontal dadoing, for example.

Cross Cutting



When cross cutting the carriage must initially be at rear of the arm in the 'parked' position (fig 2/3). The wood you are about to cut must be held firmly against the fence, which entails the back edge being quite straight. See to it that nothing is likely to be trapped between wood and fence, otherwise the wood will tend to wobble or be cut out of square. It often depends on the nature of the job whether you hold the wood by the right hand and operate the saw with the left (fig 2/4), or vice versa. However the fence to the right of the blade when cross cutting is slightly longer than the left. This makes it more suitable for longish material. Of course you can make your own alternative fence, which may be useful for certain tasks if it exceeds the width of the table. A fence with greater height than the one supplied is also needed for some operations.

For basic cross cutting, remember to retract the riving knife and raise the anti-kickback device. check the guard is fully operational, with the mitre lock engaged at 0°. As in fig 2/3 the height of the arm should be such that the blade just cuts into the table by 1mm. If you do not wish to cut into the table itself, you could fix a sheet of plywood onto the surface and cut into that instead.

fig 2/3

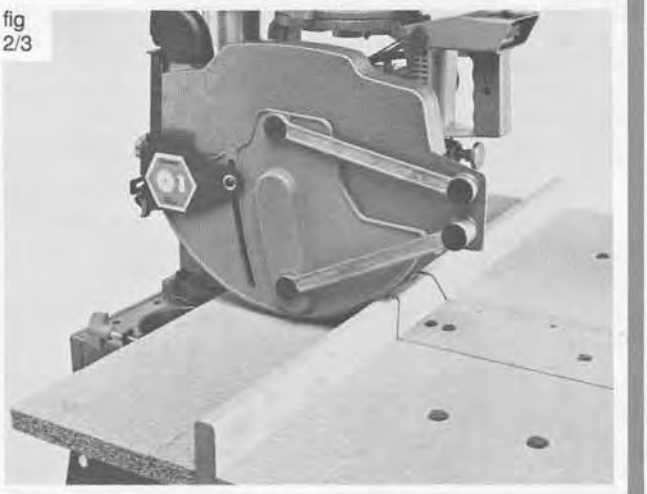
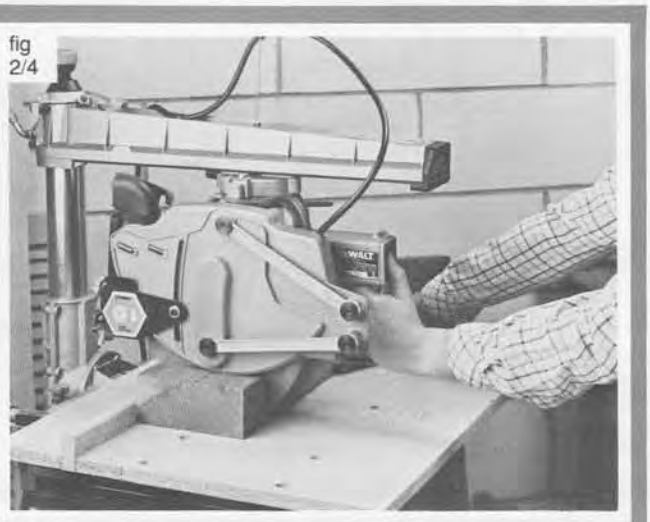


fig 2/4



A steady carriage movement is important when cutting, and sawing speed is dependent chiefly on wood thickness. If you rush, rather than cutting the teeth will simply dig in and the motor then stall. Use your ears also - a machine working sweetly sounds sweet to hear. One that is not fairly shrieks for relief.

Whilst cutting do not allow the blade to completely clear the wood on the front edge, or the blade may easily be fouled on its return if there is any movement of the waste piece. Allow the machine to run until the carriage returns to parking position, and never move sawn wood until the blade is stationary.

One great advantage of a stationary woodworking machine is the ability to perform repetitive operations with uniform precision.

Cross cutting wood to a pre-determined length is easy on the Powershop. Just cramp a piece of wood to the fence to act as a 'stop' fig 2/5. The distance from blade to stop equalling the length required (fig 2/5a). With repetition work, make a trial cut on a piece of scrap to ensure that all is well. Do not assume that the end of a piece of wood to be cut is already true. Cut off a small amount to square the end, and compare subsequent lengths with this 'trued up' end.

fig 2/5

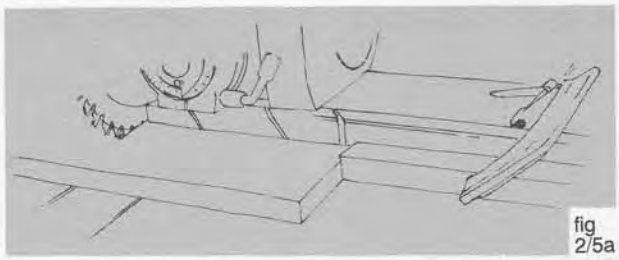
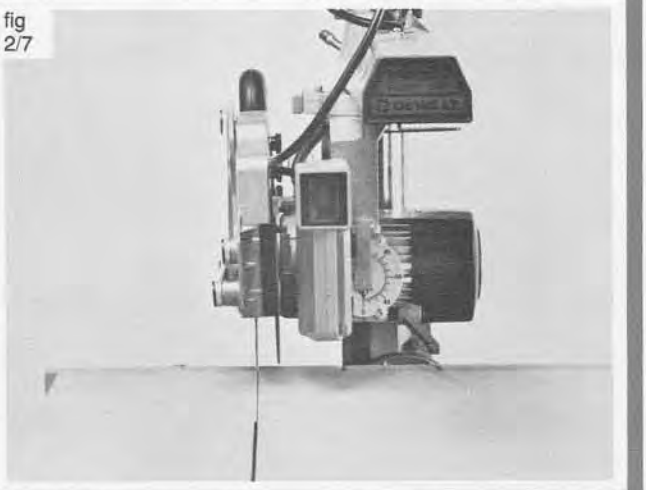


fig 2/5a

Although cross cutting capacity is necessarily limited by the length of the arm, it is possible to tackle boards of up to twice this width. Make the first cut a little over half way across the material as in fig 2/6. Then simply reverse, and carefully align the second cut with the first by use of a pencil line, fig 2/7. If the wood has surface edges which are known to be dead parallel then turn it over and cut from the reverse side. However, if the 'face' surface of the wood is critical, then reverse it 'end to end' so that the cut is completed on the same side it was started. This method of reversing is essential if the narrow edges are not parallel.

fig 2/7



The standard blades of 250mm diameter have a maximum depth of cut of 70mm, which is the clearance between the motor housing and the tip of the new blade. One can saw wood of up to 138mm by cutting from both sides, but the arm must be raised sufficiently for the motor to clear the wood being cut (fig 2/8). The first cut is fairly straightforward, and should be to a depth of slightly more than half the thickness of the wood (fig 2/9). When the wood is reversed it must be positioned so that the first kerf is precisely in line with the shallow cut already in the top of the table (fig 2/10). The second cut is then easily made.

fig 2/6

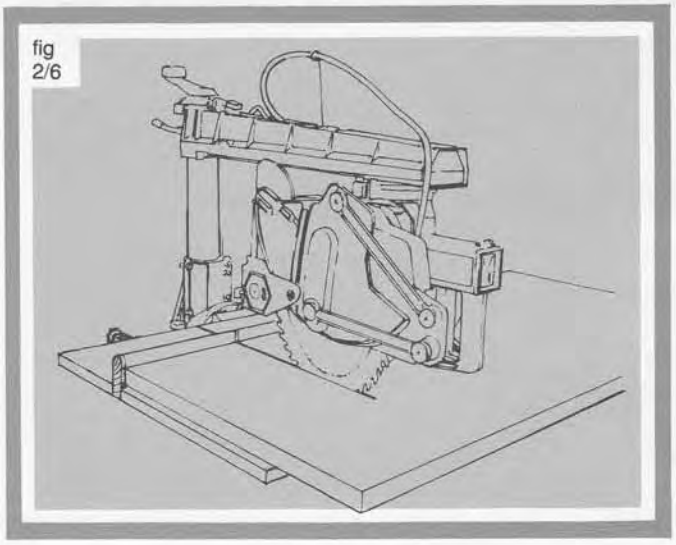


fig 2/8

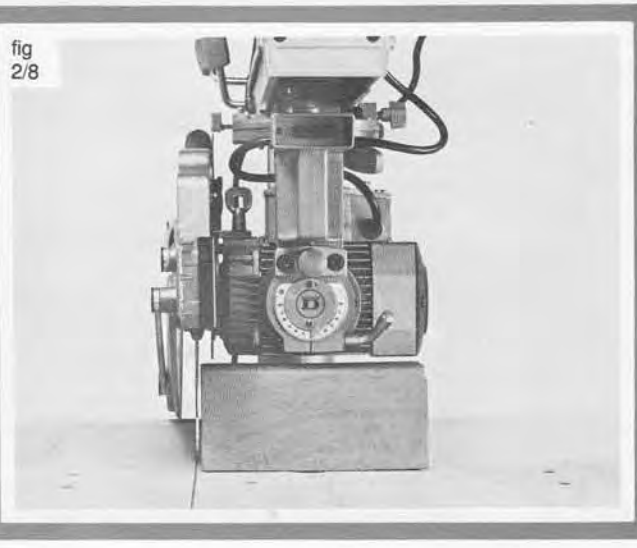


fig 2/9

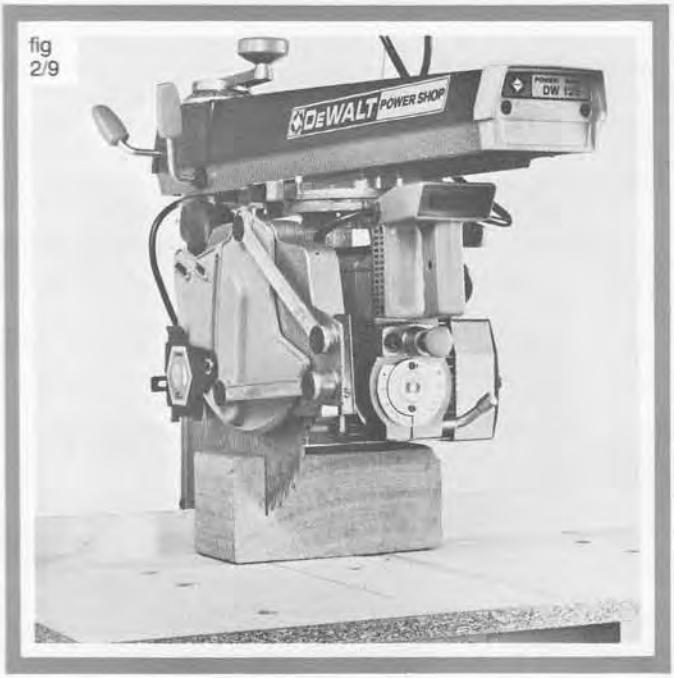
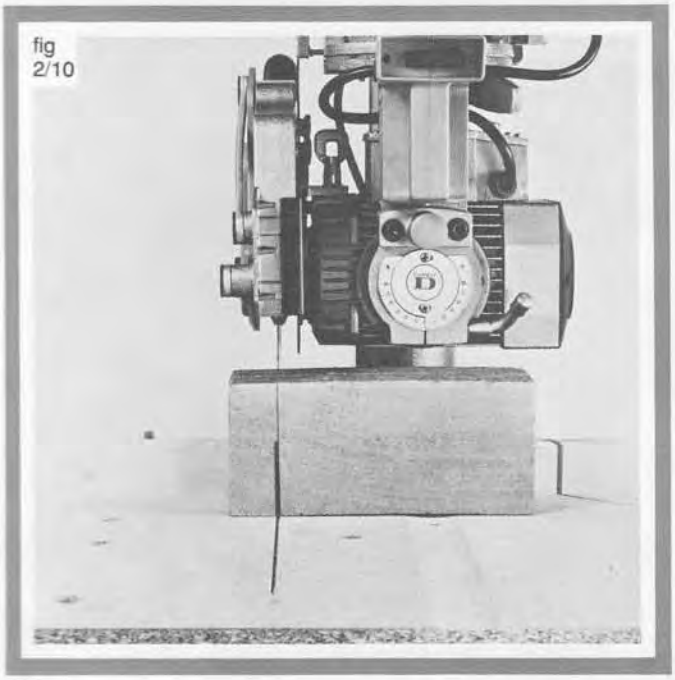


fig 2/10

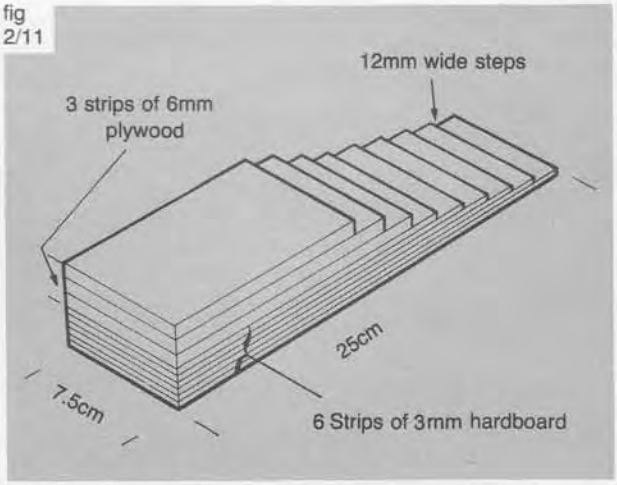


NOTE: NEVER MOUNT BLADES OF GREATER DIAMETER THAN 250MM WHICH IS THE MAXIMUM SIZE THE GUARD IS DESIGNED FOR.

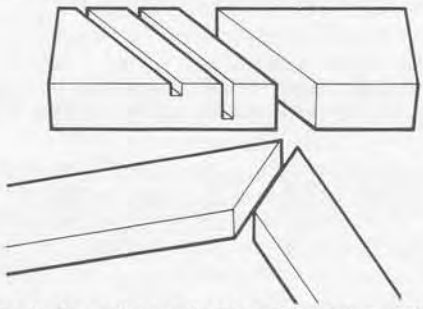
The one scale missing on the Powershop is that for measuring the cutting depth. This is because the depth of cut is a function of the thickness of the material, which is infinitely variable within the machine's maximum capacity, and the height of the sawblade above the worktable. If you only wish to cut right through the material, then of course the blade is set to cut a shallow kerf (1mm) in the table surface. On the other hand if you wish to cut a shallow groove or slot of for example 12mm depth in 18mm stock, the blade should be 6mm above the table. Set the blade height either by using the elevating handle alone, each complete turn altering the height by 3mm approximately, by physically measuring the gap between the blade and table surface, or else use a home-made height gauge as in fig 2/11. When using this gauge raise the blade a little higher than you need to for the cutting depth required. Then lower the blade until it just touches the right step on the gauge. The gauge itself is made from strips of 3mm hardboard and 6mm plywood, glued or nailed together. The gauge is equally useful for setting the height of other tools, such as dado heads etc.

When cross cutting plywood and other faced boards there is a tendency towards splintering on the exit side. Therefore place the material face uppermost on the worktable to minimise this, and use a T.C.T. blade for a cleaner cut.

fig 2/11



Mitre cutting



A mitre is loosely understood to be a 45° cut, so that two such cuts combine to give a right angle, for example a picture frame corner or door architrave. However a mitre is really any cut across the wood other than at 90° (fig 2/12). Mitres made in wood of unequal width must be at different angles if the two pieces are to meet at 90°. These examples are shown in fig 2/12a. As 45° mitre cuts are most common, provision is made for the arm to be locked at this angle either to the left or the right. If the machine is accurately

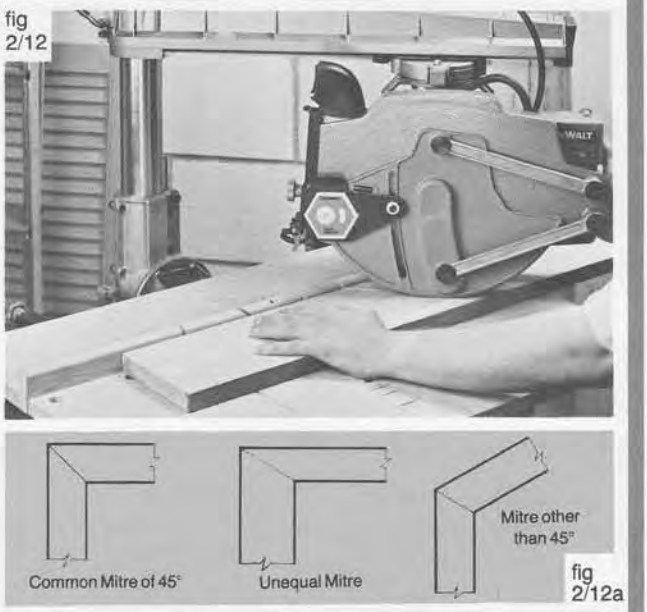


fig 2/12

fig 2/12a

set up therefore, no further setting is required. For the first cuts made at a new angle, an initial cut has to be made both in the fence and into the table as in normal 90° cross cutting.

The position of the fence for mitre cutting depends on the thickness of the material being cut (see fig 2/2).

Sometimes when making mitre cuts the wood will tend to creep slightly sideways. This can be solved by locking it in place or by constructing an adapted fence to prevent sideways motion. Drive a few panel pins into the fence so that they protrude and grip the piece to be cut.

Rules of safety and procedure are the same as for normal cross cutting. The fence must be set in the rear position when making an angle cut on the left side of the table (fig 2/13). After the initial cut through fence and table, the piece is cut as before (fig 2/14).

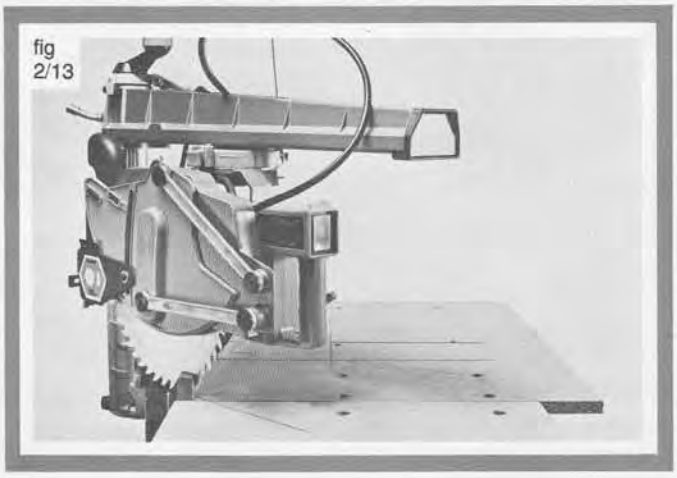


fig 2/13

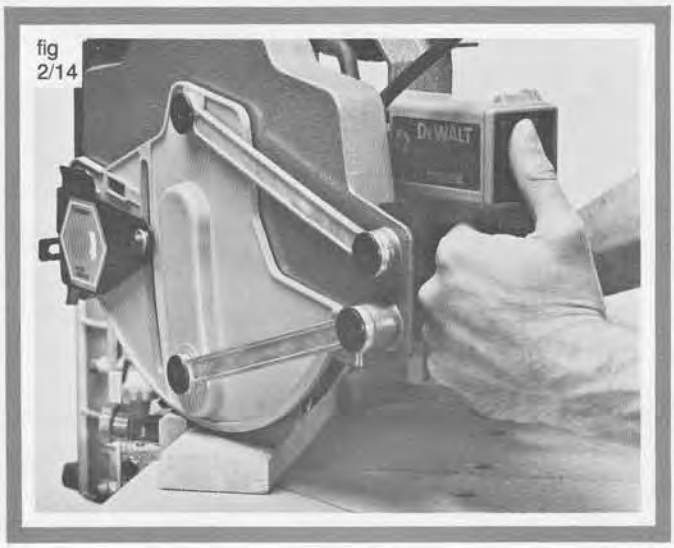
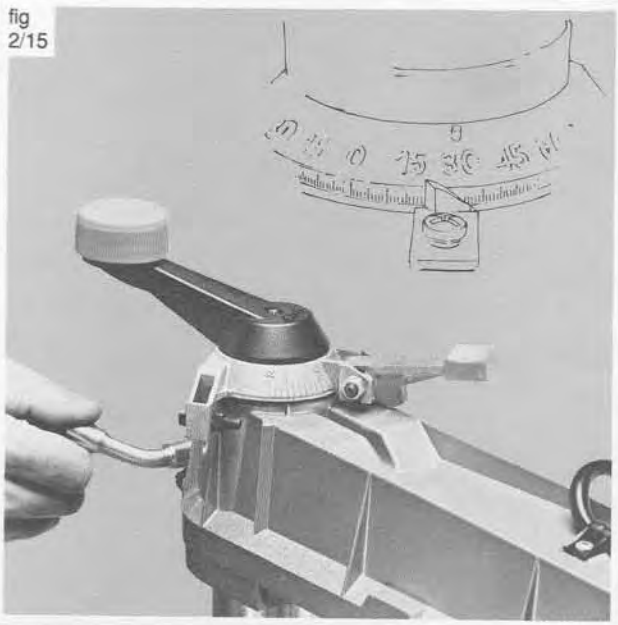


fig 2/14

N.B. Left hand mitres on the DW 320 require the fitting of the side extension table before work can commence.

For angle cuts other than true 45° mitres, position the arm using the mitre clamp and the scale beneath the elevating handle for the required angle (fig 2/15). With these cuts it is important to check the angle whilst work is in progress. Owing to the distance from the scale to the cutting point, a minor fault in the setting when the arm is locked will be magnified when cutting the wood. Make a trial cut in a piece of spare wood first, since even an error of less than one degree can lead to ill-fitting pieces.

fig 2/15



Though the arm can be swung through left to right, the limit for actual cutting is 45° (slightly more on the DW 125).

A non-identical pair of special mitre fences are available as an optional accessory for the Powershop, which will allow cuts to be made from 0° (in theory) to 90° (fig 2/16). These fences also allow for very acute cuts to left or right (fig 2/17), as well as conventional cuts of more than 45° (fig 2/18).

fig 2/16

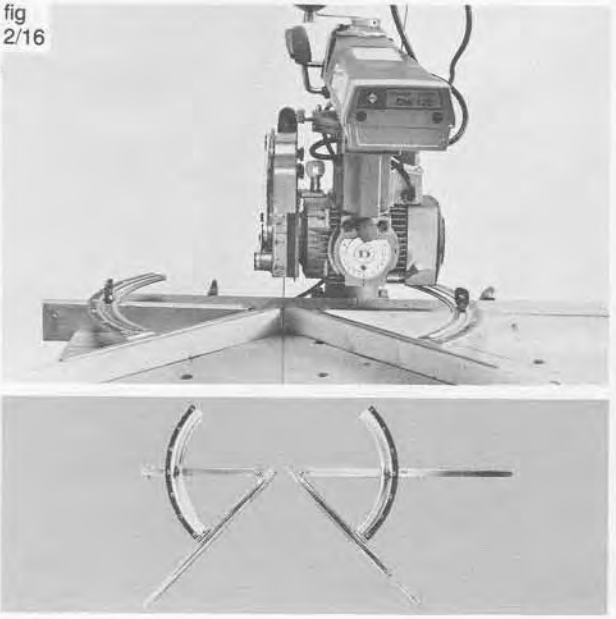
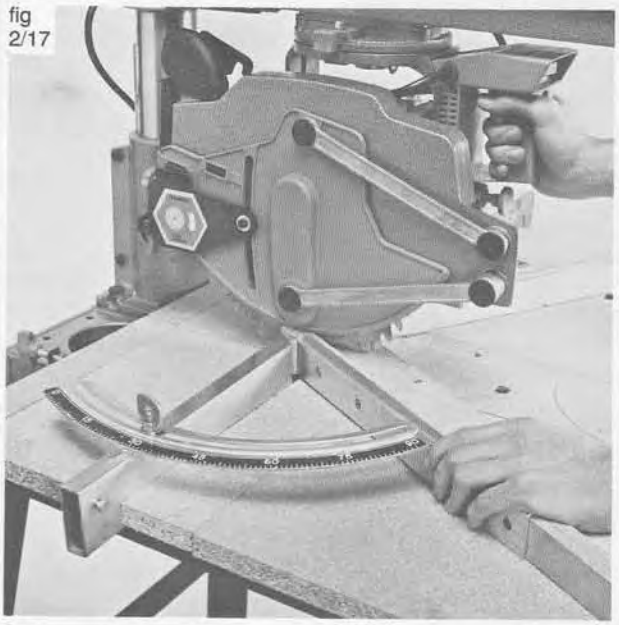
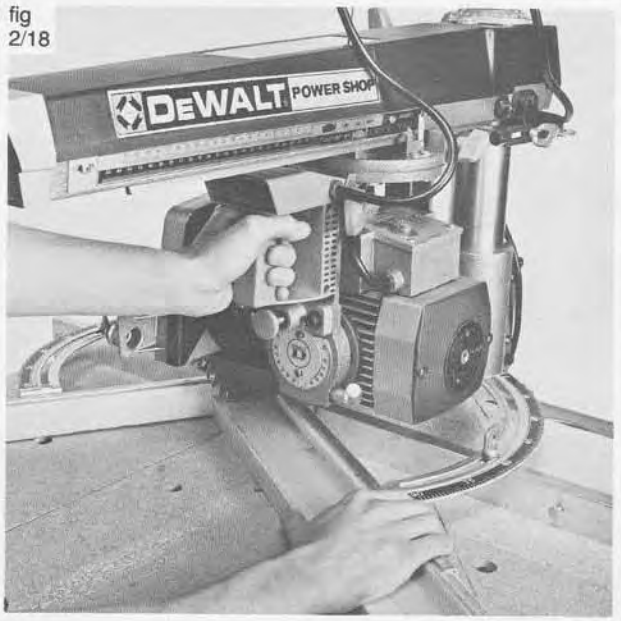


fig 2/17

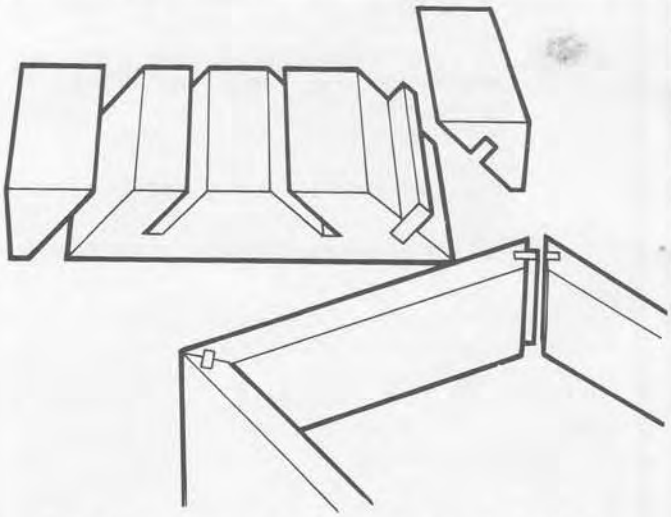


The mitre fences prove very useful when a project requires various mitre angle cuts, avoiding the necessity to make a new cut in the standard fence for each new mitre angle.

fig 2/18



Bevel Cutting



This is a cut which is square across the wood face, but angled in thickness (fig 2/19). As the motor must be partly rotated within the yoke, the bevel latch at the lower end of the yoke should be released and the clamp lever slackened (fig 2/19a). The motor only tilts anti-clockwise when sawing and the bevel latch automatically engages at 45°and 90°. For other angles the bevel clamp lever will hold the motor at the required inclination, with the protractor scale and pointer establishing the setting (fig 2/20). Before the motor can be rotated, the arm must be raised to allow clearance of the blade and guard over the table. Lower the arm and make the first cut through the fence and into the table surface, leaving the waste on the left hand side whenever possible (fig 2/21). Otherwise the small piece of scrap may possibly foul the blade.

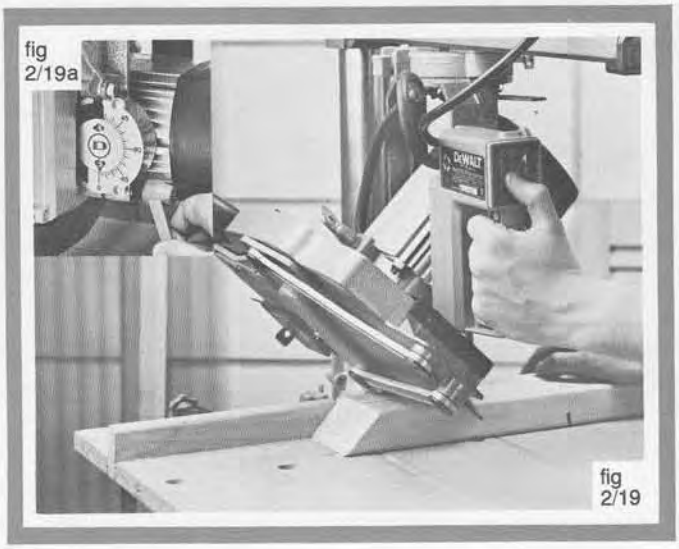


fig 2/19a

fig 2/19

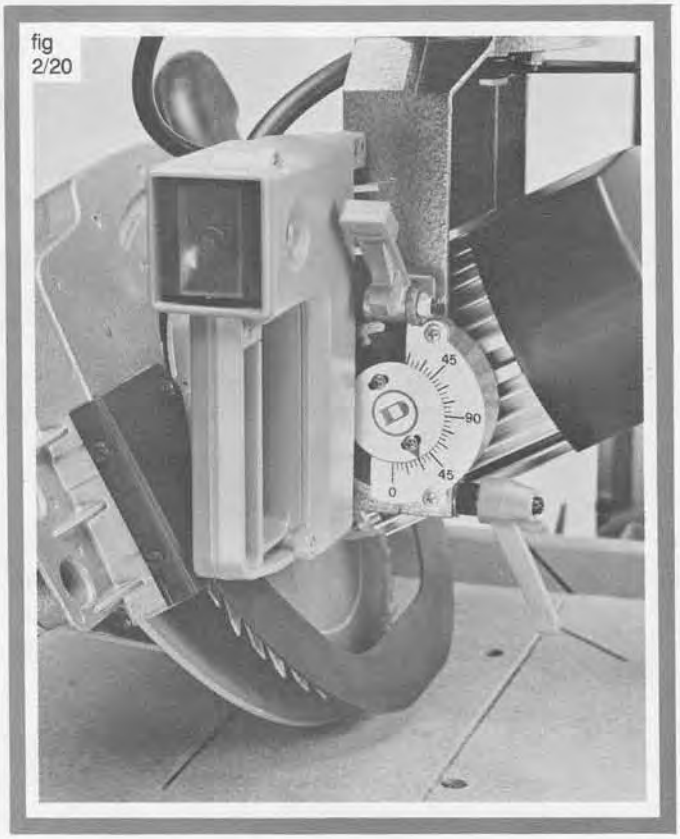


fig 2/20

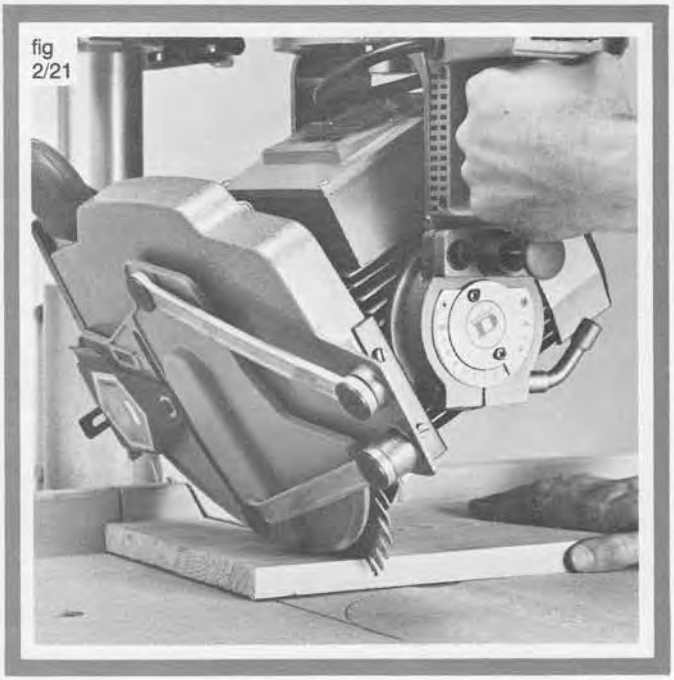
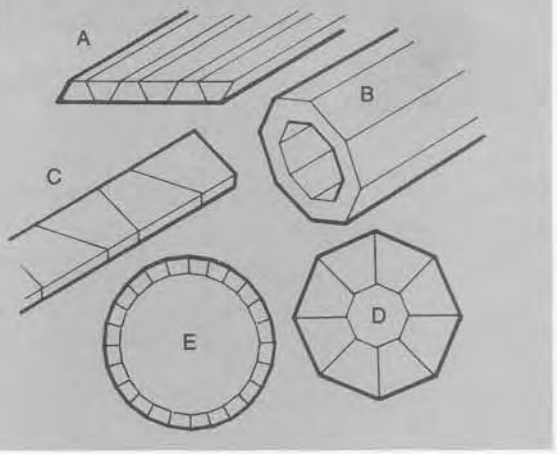


fig 2/21

fig 2/22



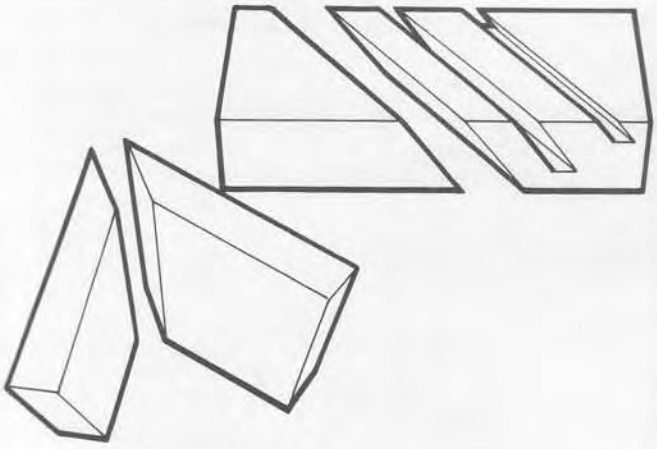
The maximum thickness of wood which can be sawn when bevel cutting is reduced to around 45mm, and in wood of this thickness the actual cut is half as much again.

Repeated bevel cuts can be used to produce a cylindrical structure. Each segment has to be cut at exactly the same angle on each side and then the pieces can be assembled to form a cylinder or circle. The shapes shown in fig 2/22 can be formed by making bevel cuts in the cross-cut or rip position depending on the length of cut required. The more segments you cut and the narrower they are, the closer you are to having a true circle.

fig 2/22:

"Examples of segment cutting: Shape B is derived by bevel-ripping the material as shown in A. E shows that a larger number of narrower segments comes closer to a clean, circular shape. Shape D is actually produced by Mitre-cutting the material shown as C".

Compound mitre cutting

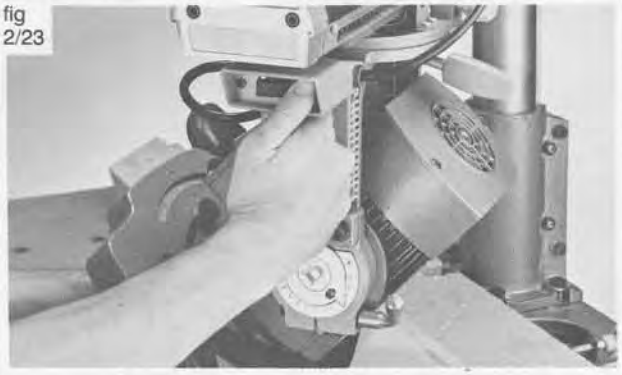


Combining a bevel with a mitre cut is easy on the Powershop (fig 2/23). This compound angle cutting is mainly used for corners of boxes with splayed sides, and also by joiners in roofing work.

Although the arm can be swung to left and right, the blade only tilts in one direction. Therefore the work has to be reversed after the first cut for the corresponding matching cut (fig 2/23a).

The illustration in fig 2/24 shows an example of a 4-sided box with splayed sides which can be made using a compound angle cut. This example has a splay angle of 25° which required the blade to be bevelled to 40° and the arm to be set for a 23° mitre as asterisked in the table (fig 2/25) which also shows other combinations necessary for different splay angles.

fig 2/23



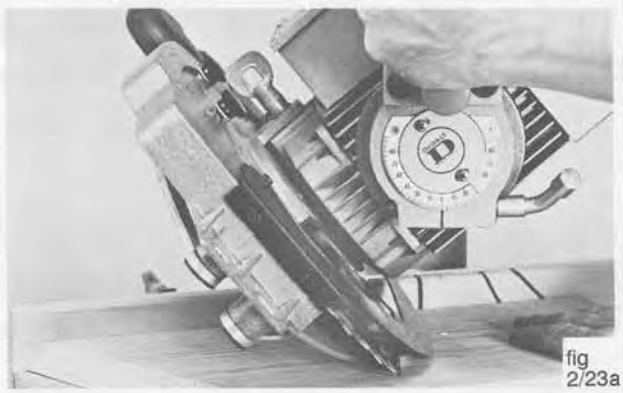


fig 2/23a

fig 2/24

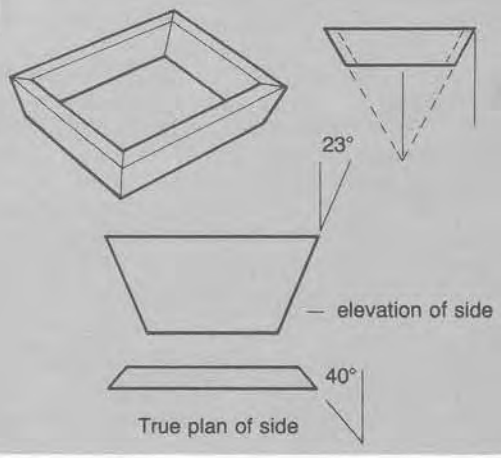
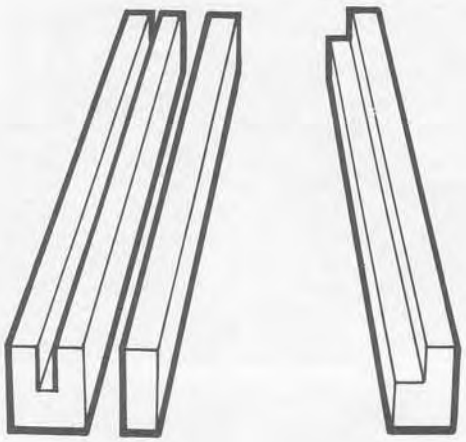


fig 2/25

Display of Box	Angle of Blade	Angle of Arm
45°	30°	35° 15′
40°	32° 30′	32° 45′
35°	35° 15′	29° 45′
30°	37° 45°	26° 30′
*25°	*40°	*23°
20°	41° 45′	18° 45′
15°	43° 15′	14° 30′
10°	44° 15′	9° 45′
5°	44° 45′	5°

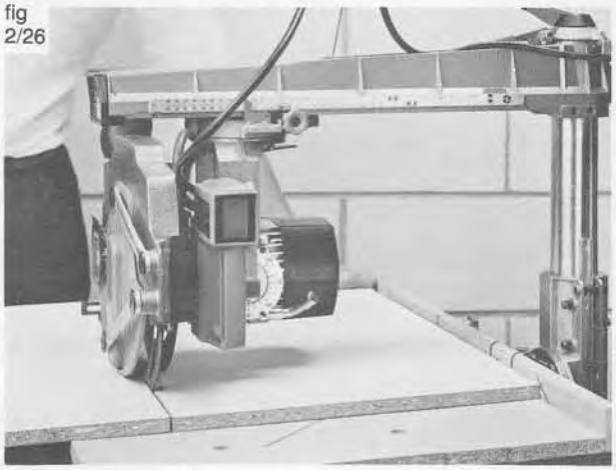
Rip-Sawing



The Powershop has a remarkable capacity for ripping timber and sheet materials of all normal sizes (fig 2/26). Indeed all but the largest pieces can be undertaken single-handed. When ripping, rotate the blade through 90° making the blade parallel to the fence. Release the plunger at the top left of the rollerhead (and the yoke clamp – fig 2/26a) which will automatically engage as the 90° rotation occurs. This can be clockwise or anti-clockwise, resulting in the blade either facing the fence or positioned away from it. Remember to resecure the yoke clamp before switching on.

These alternative blade positions can handle many different widths of material. To saw narrow and medium width work the blade faces the fence. This is known as the 'in-rip' position, and is the customary one for the bulk of rip sawing.

fig 2/26



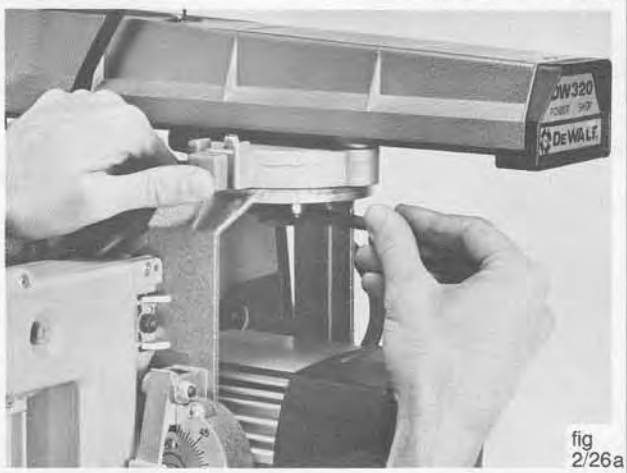
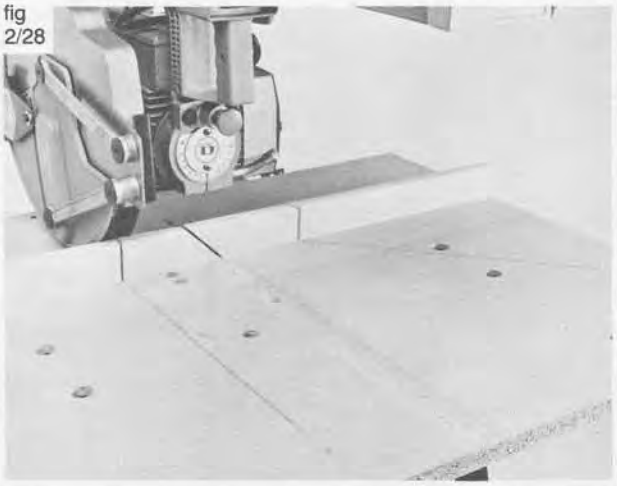


fig 2/26a

fig 2/27

fig 2/28



When using the Powershop at its maximum rip sawing capacity, the blade faces away from the fence in the 'out-rip' position, with the fence placed at the rear of the table. Before attempting either ripping method, form a shallow groove across the top of the table with the saw. This allows the blade tip to penetrate just below the table surface during ripping. To make this curved cut position the blade and the fence for out-ripping, with the carriage at the outer limit of the arm (fig 2/27). The blade will be just clear of the table edge. With the machine switched on and the arm lowered, move the carriage slightly back towards the column until the tip of the blade cuts to a depth of about 1mm into the table. Then move the carriage back to its limit, whilst the blade cuts the shallow curved hollow. This cut (fig 2/28) allows the carriage to move along the arm with the correct blade height for ripping, and thus eliminates the need for height adjustment between rip-cuts of varying widths.

A great deal of dust is created when ripping, especially when working on man-made boards. So wipe the roller tracks in the arm with a dry cloth after ripping, ensuring a smooth carriage movement when cross cutting is resumed.

In-Ripping

When in-ripping, feed the wood from right to left into the teeth of the blade, and always use the riving knife (fig 2/29). This clears the passage of the blade through the kerf, and sees that the wood does not 'pinch' the blade. Use the two knobs on the inside of the blade guard (fig 2/30) to set the knife to about 10mm above the table and 1-3mm from the blade (fig 2/30 inset).

fig 2/29

fig 2/30

Adjust the anti-kickback device in proportion to the thickness of the wood to be cut (fig 2/31). The correct position is when the shoe lightly touches the wood, leaving the fingers free to trail (fig 2/32). Always have a Push-stick on hand to push the wood past the blade at the end of the cut. This is depicted in fig 2/33. Check that the edge of the wood facing the fence is straight, and although the rip scale can be used as a guide, check the distance of the blade from the fence with a measuring tape for complete accuracy. Hold the wood firmly and with a steady downward pressure throughout. The forward movement should be uniform, and at a speed which allows the motor to achieve full RPM without labouring. At the end of the cut, keep the fingers well clear of the blade by use of the push-stick (fig 2/34). Never attempt to withdraw the wood during cutting, as the anti-kickback fingers will prevent it. Simply switch off the machine, allow the blade to stop and then retrieve the wood.

fig 2/31

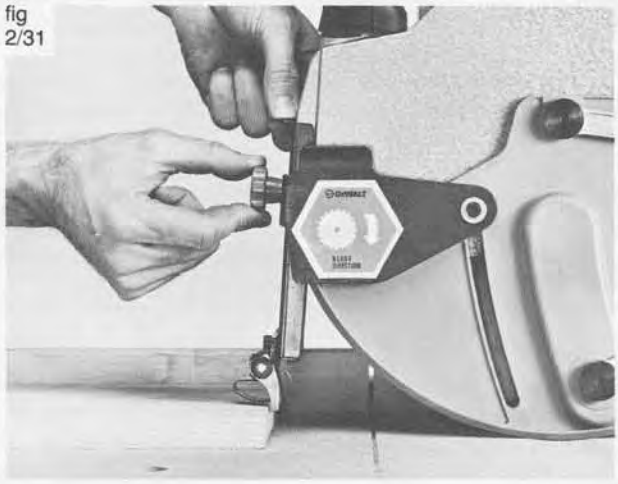


fig 2/32

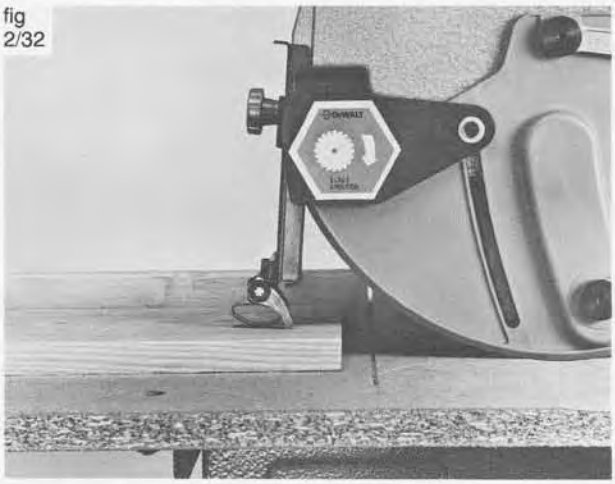


fig 2/33

fig 2/34

Out-Ripping

The basic difference between in-ripping and out-ripping is in the direction of feed. When out-ripping, the direction must be from left to right, and into the teeth (fig 2/35). Rotate the motor so the blade faces away from the fence, and the plunger engages in the appropriate gate. Resecure the yoke clamp and then set the anti-kickback device to the thickness of the wood. The same rules then apply as for in-ripping (fig 2/36).

fig 2/35

fig 2/36

Deep Rip-Sawing

This is a similar technique to cross cutting wood in excess of 70mm and is done by working from both sides. Make sure that the wood will pass below the motor, and take account of the depth of cut being made (fig 2/37).

When ripping, always take special care with the last part of the cut as, for a very short distance, the anti-kickback fingers become inoperative just before the cut is completed (fig 2/38).

The procedures here are the same as for ordinary ripping. The essential thing when deep cutting is that the same edge is presented to the fence on the second cut. It is a good idea to fit a higher fence if the dimensions of the wood mean that a fairly narrow edge is resting on the table.

fig 2/37

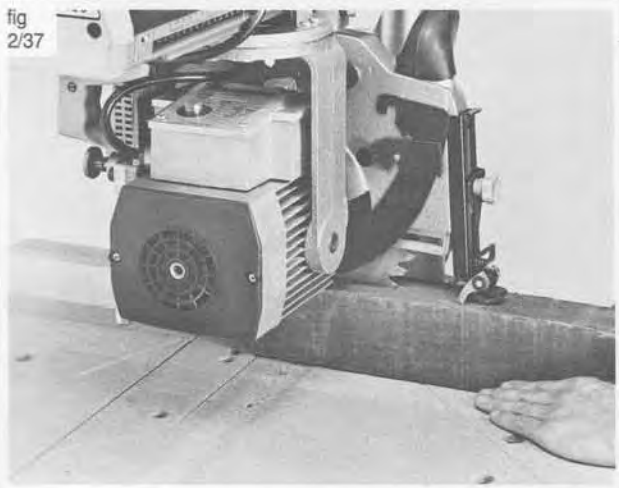


fig 2/38

Bevel Ripping

Tilt the motor and blade within the yoke to the required angle (fig 2/39), carefully positioning the anti-kickback fingers to allow for the tilt (fig 2/40). After readjustment, the actual sawing procedure is the same as for normal ripping. This also applies to narrow cuts from the right, and wider cuts from the left.

fig 2/39

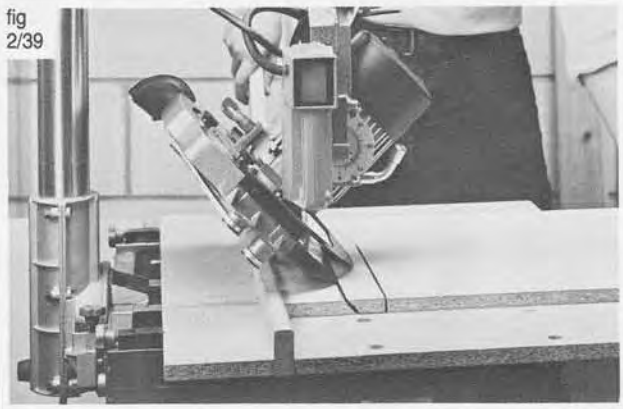
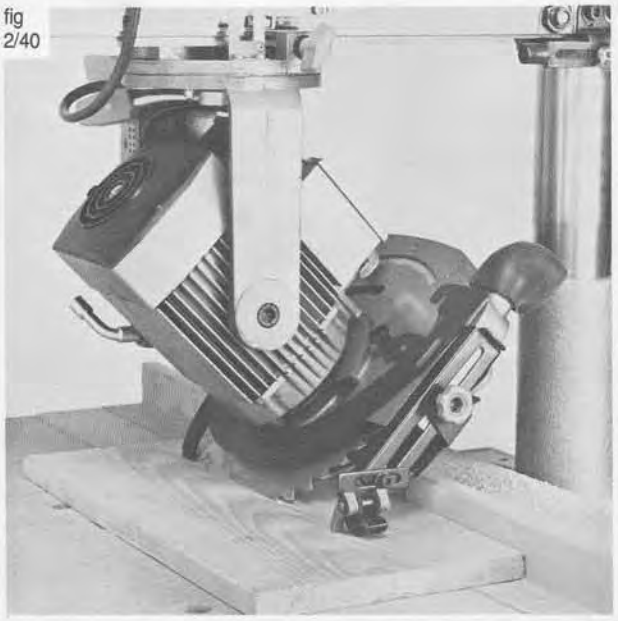


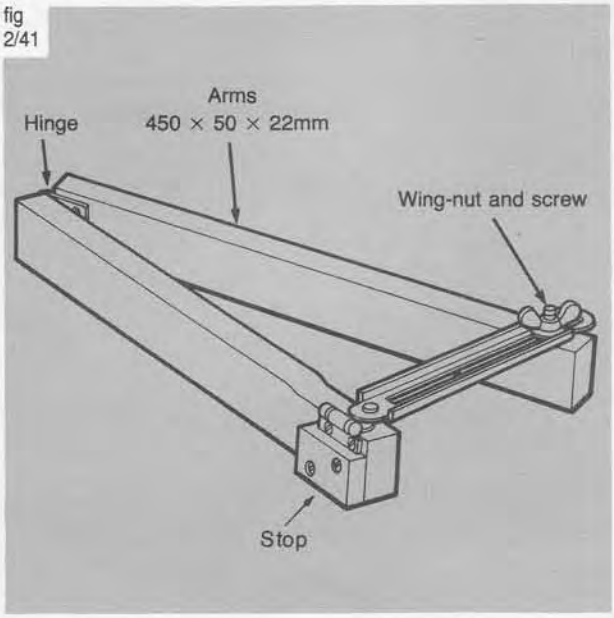
fig 2/40



Taper Ripping

It is often an advantage to be able to cut several pieces all to an identical taper and there are several ways in which this can be done on the Powershop. A simple home-made jig makes the operation as easy as straight ripping (fig 2/41). For tapers on long pieces, hold the wood against the outer arm of the jig whilst

fig 2/41



the inner arm slides along the fence as the cut is made (fig 2/42). Tapers in furniture making are made on either one or both wood edges. Examples of these are shown in fig 2/43. To taper both edges, reset the jig at double the original angle for the second cut. Check that the line of the taper is parallel with the rear of the jig by marking out the work with the actual taper on it.

fig 2/42

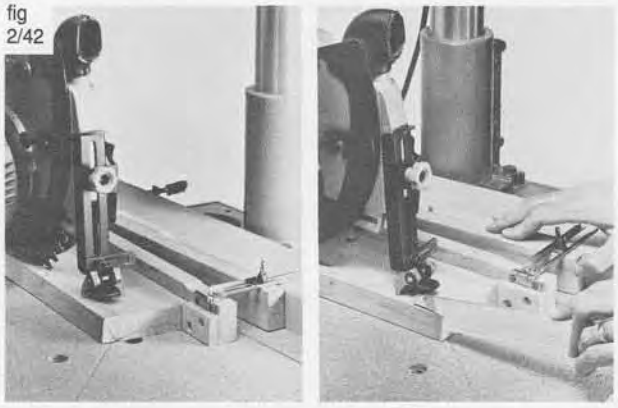
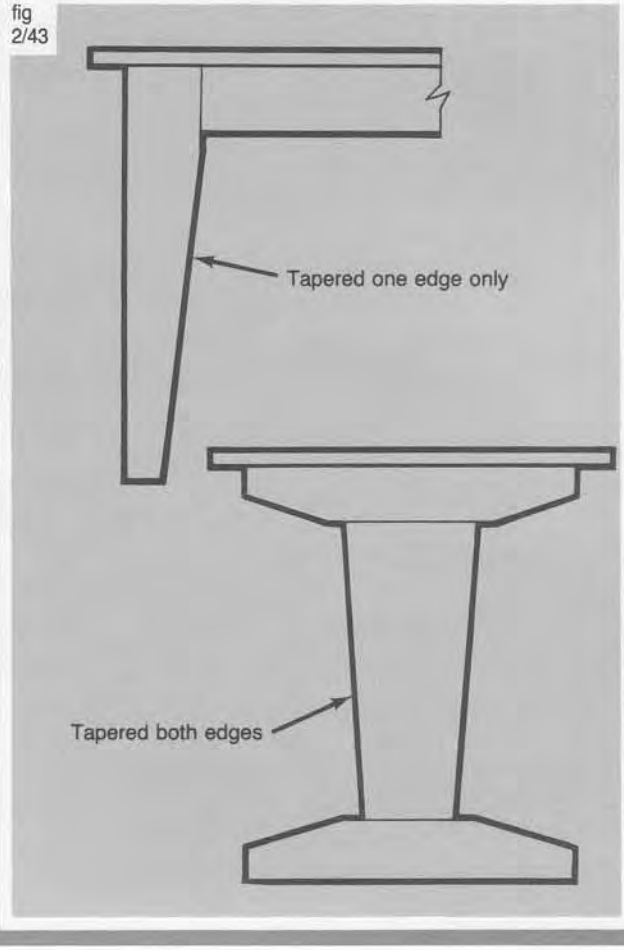


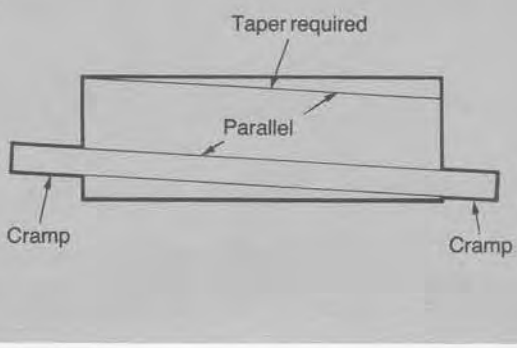
fig 2/43



This operation should be carried out after all joints have been cut. As an example, suppose a piece of wood tapered on both sides has to have a trench formed in it. A tri-square cannot be used for the marking-out (assuming the trench is at right-angles to the centre-line). Although such trenching can be done on the Powershop, it is a much easier exercise when the edges are still parallel.

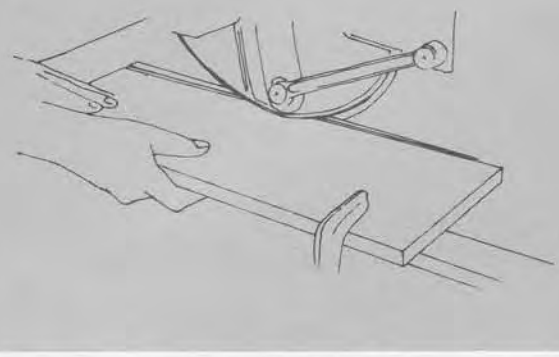
If you possess the special mitre fences, these can also be adapted to form a taper-jig. A replacement fence of the same height as the rear arm of the mitre fence is required in the table. Screw a stop to the mitre fence and remove the zeroing screw in the side to allow the rear arm to slide along the main table fence without obstruction. The procedure is then the same as with the home-made jig.

fig 2/44



The last method of making taper cuts is particularly suitable for long pieces. Cramp a straight length of wood to the work, dead parallel to the cut, but some distance from it (fig. 2/44). Swing the blade to the out-rip position, with the distance from blade to table edge equal to the piece crammed on the cut to be made. This piece is then used as a guide along the edge of the table as the cut is made (fig. 2/45).

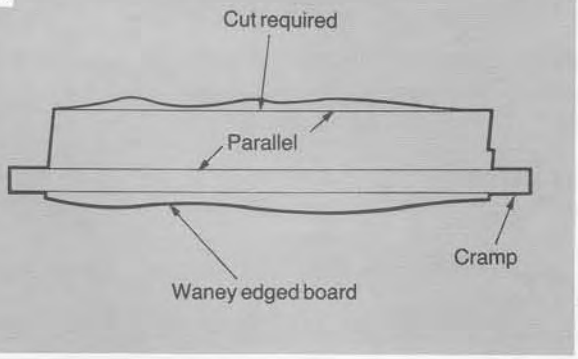
fig 2/45



Waney-Edged Wood

Waney or unevenly edged boards can present a problem in achieving an accurate saw cut. The solution is similar to that used for taper sawing. Cramp a straight piece of timber to the board as in fig. 2/46, and the second waney edge is then cut as in normal ripping.

fig 2/46



Chapter 3

Further Cuts

CHAPTER 3

FURTHER CUTS USING THE BASIC SAWBLADE

Due to the mobility of the Powershop blade, a wide variety of additional cuts can be carried out. All the cuts described in this chapter are performed with the basic machine and general purpose steel blade, although a T.C.T. general purpose blade is preferred, due to its greater efficiency and longer life.

Trenches or Dados

Cutting a trench or dado forms the basis of the various types of housing joints. After marking out the trench, check that the arm is locked in the central 0° position. Raise the blade until just clearing the wood to be cut, and then lower until the teeth touch the surface (fig 3/1). Return the carriage to the parked position, and lower the arm by an amount equal to the trench depth. Line up the wood so that the edge of the trench is level with the blade, and make the first cut on the waste side. After any adjustments, cut alongside the opposite edge of the trench (fig 3/2) and then make a series of intermediate cuts to remove the rest of the waste. (fig 3/3). Making initial cuts alongside the lines eliminates a 'half cut' having to be made at one edge of the trench, which can lead to the wood drifting to one side. If a trench is to be made in the narrow edge of the material, ensure stability by fitting a taller fence between the movable table sections or by properly supporting the work-piece.

fig 3/1

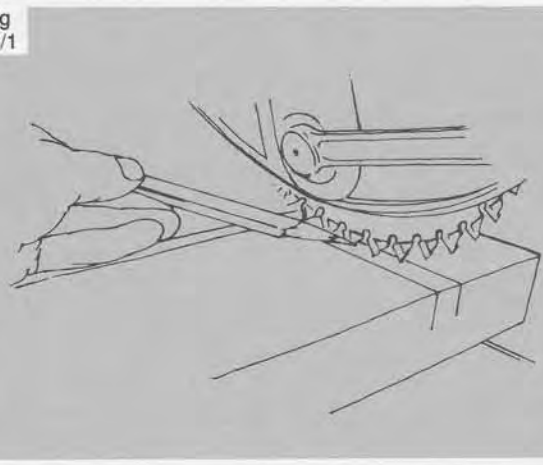
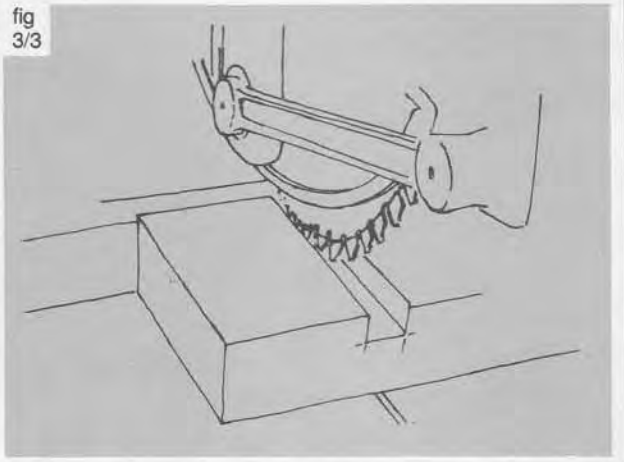


fig 3/2

fig 3/3



To make a 'stopped' trench, cramp a block of wood to the table to control the forward movement of the arm, thus limiting cutting to the desired point in the trench. This acts as a buffer when the lower part of the motor housing abuts against it. The size of the block of wood used depends on the height setting of the arm. Of course stopped trenches will have to be completed by chisel.

Cutting an angled or mitred trench is little different from one which is square across. However, make a trial cut in scrap to set the arm to the exact angle you are after.

Dovetail housing is a particularly strong variety of housing joint. Here the slope will resist any direct pull on it. A through dovetail housing is shown in fig 3/4. With wide material, it is normal practice to make only one side of the trench of dovetail form and, to assist in assembling the parts, this side is also made to taper.

This joint can also be made 'stopped'. Set the motor within the yoke at 15°, which is the usual angle for a dovetail (fig 3/5). Otherwise the operation is the same as normal trenching. An average taper is around 3mm, though this depends on width of material and the extent of the trench. (The mitre angle of the arm relative to the fence therefore needs to be set to reflect this required taper).

fig 3/4

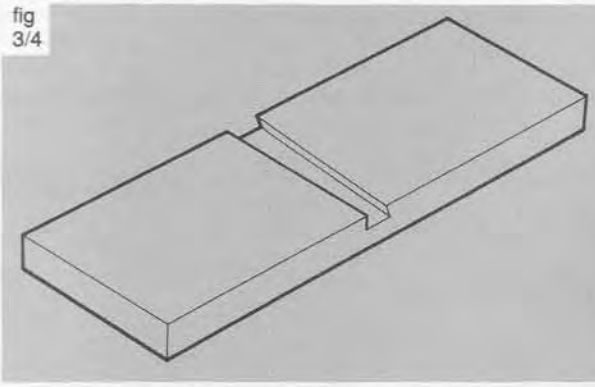
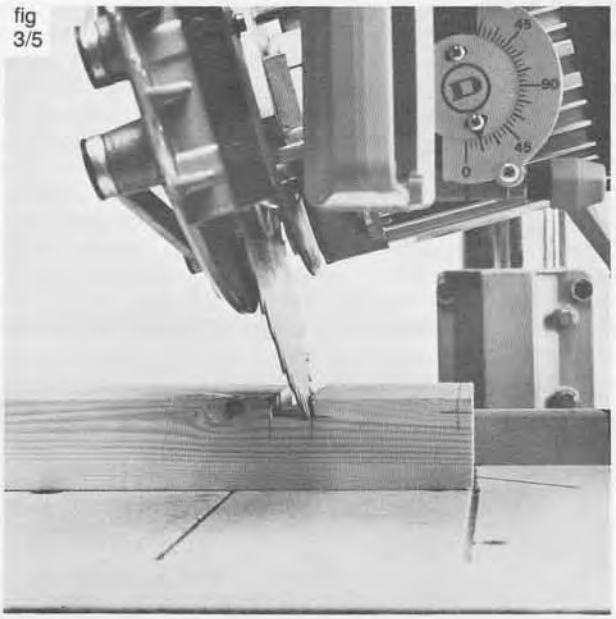


fig 3/5



Half Lap Joints

Set the height of the blade as for trenching, or directly from the marking out. Bring the end of the wood to the tips of the teeth on the blade, so that they are level with the line indicating the extent of the cut. This is usually half the thickness of the wood (fig 3/6). Most halving joints are made at the ends of the wood, so fix a stop to the fence to determine the cutting limit, but remember to allow for the blade thickness. When removing waste make the inner or shoulder cut first, and then work outwards (fig 3/7). Where a series of cuts are made in this way, these are referred to as 'passes'.

fig 3/6

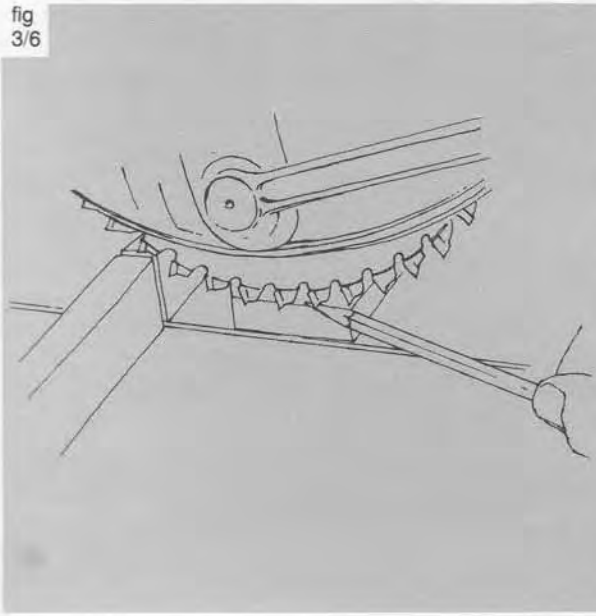


fig 3/7

Tenons

The basic procedure is the same for cutting tenons as for half laps. Set the blade to the required height and position a stop to make the first cut exactly up to the shoulder line. Then make a series of passes to remove the rest of the waste (fig 3/8), before the wood is turned over for completion (fig 3/9). Where tenons are off-centre or have long and short shoulders, work cannot simply be reversed. The blade and stop have to be reset. Remember to make all similar cuts first, ensuring that the stop is sufficiently large when the work is reversed.

fig 3/8

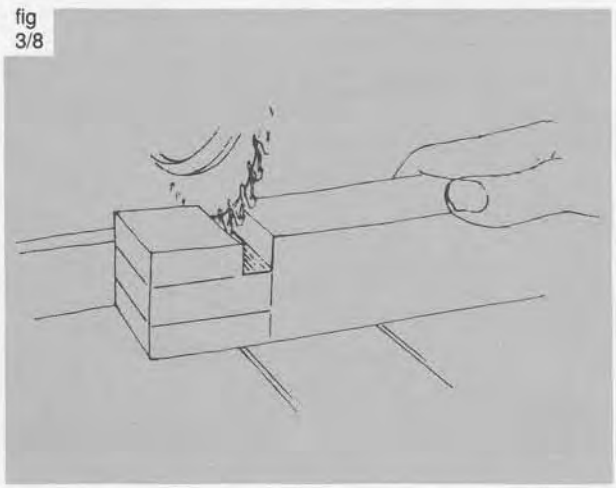
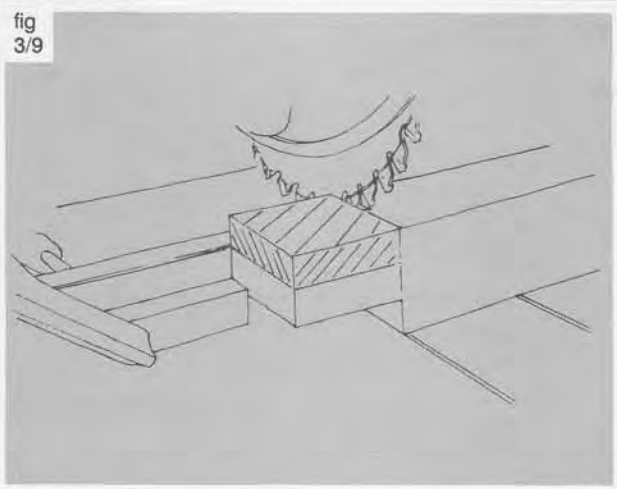


fig 3/9

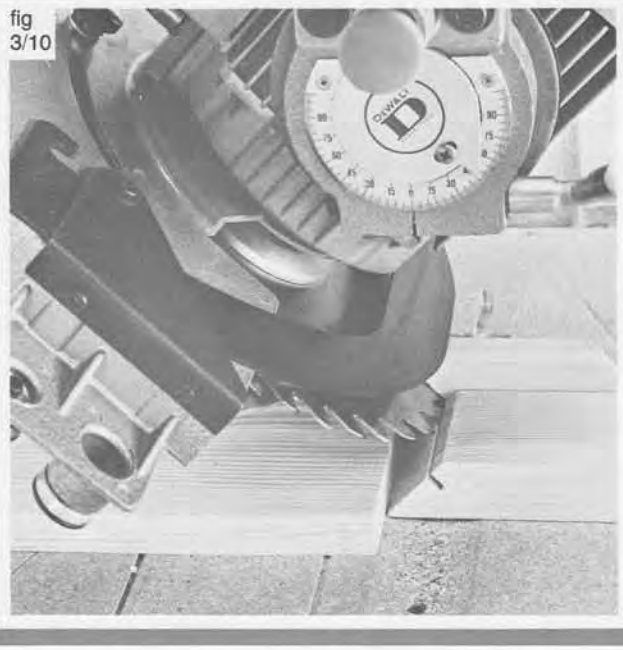


Tongued Mitres

Making bevel cuts was described in the previous chapter, and 45° bevel cuts are often used to form the so-called 'mitred' corners of box-type constructions. An easy way to increase the strength of such a mitre is to add a tongue. Always use stops when cutting grooves in the bevelled ends, for precise matching at the corners. As the blade will only tilt one way, all such cuts have to be made from one side. (fig 3/10). The groove for the tongue should be positioned a third of the way across the slope, measured from the inner slope. Because of its cross grained structure, plywood makes an ideal tongue. However if tidy edges are important, use solid wood cut across the grain.

To cut a tongued mitre joint along the edge of a piece of work, swing the blade to in-rip or out-rip position setting for height, angle and depth of cut. For accurate grooving at a consistent depth apply downward pressure on the wood as you pass it beneath the blade.

fig 3/10



Saw Kerfing

To effect bending in wood make a series of saw kerfs across the face approx. 8mm apart (fig 3/11). The closer the cuts, the greater the curvature (fig 3/12). If the kerfs are too far apart, the outer face will not remain smooth. In addition the depth of the kerf affects the radius of curvature, though usually they are made within 3-4mm of the opposite face. An easy method of assessing the gap required between the kerfs and their depth for a given radius is shown in fig 3/13. To facilitate the bending process the area of wood should be fairly straight-grained and knot-free, and the kerf should be wrapped for a time in hot wet rags.

Kerfing is ideal for making decorative mouldings as shown in fig 3/14. Using the crosscut or mitre position, these cuts were made to a limited depth to prevent weakening the strips. On the other hand spacing and pattern is entirely a matter of choice.

Kerfing in order to bend wood cannot be used where the wood is a structural part of the job and strength is important. Its use is primarily for decorative purposes as in shaping skirting boards for bay windows for instance.

fig 3/11

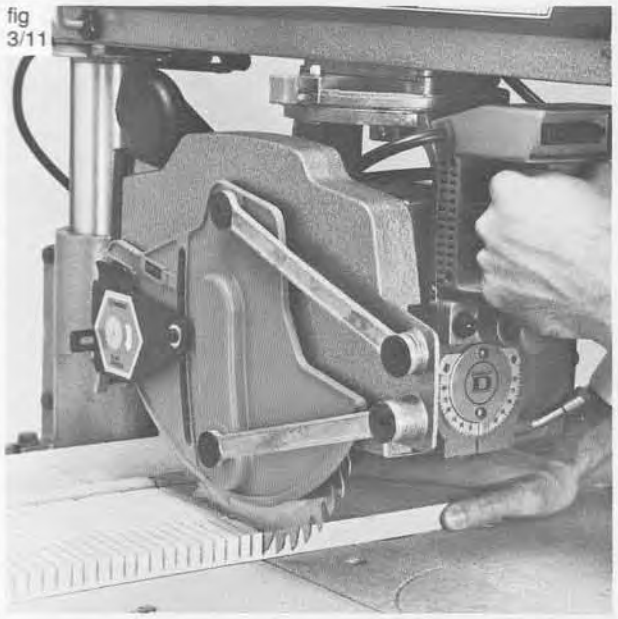


fig 3/12

fig 3/13

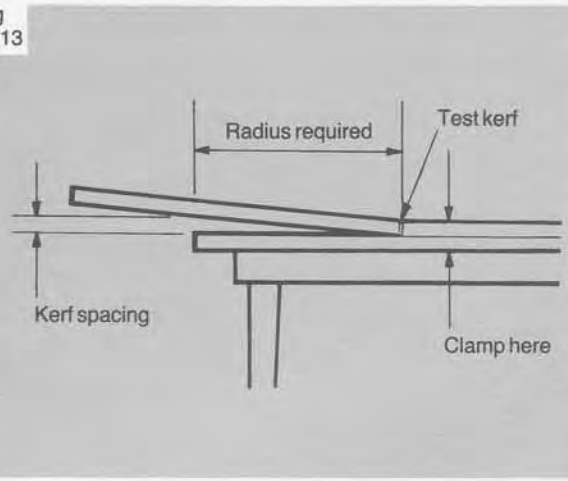
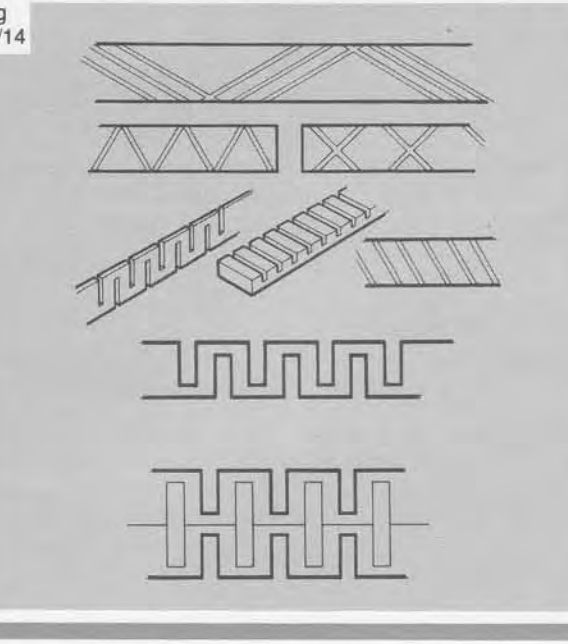


fig 3/14



Rebates and Grooves

These much-used cuts form the basis of many joints and are illustrated in fig 1/3. Mark out the work and set the blade to in-rip position, feeding from the right. Check the arm height and lock the carriage to give a first cut at one side of the groove. Make a kerf in the wood and check for accuracy, before moving the carriage to make the 2nd kerf at the other extreme of the groove. Then move the carriage a blade thickness to make each subsequent pass. Continue until the full width of the groove has been cut (fig 3/15). With wide grooves the anti-kickback device may not function properly in a fixed position for all passes, so lower the fingers to fit within the part-cut groove, or sideways to the uncut wood. A higher fence is needed if cutting a groove on a fairly thick piece of material.

There are two ways to cut rebates depending on the size of the cut. For small rebates, simply make a series of passes as in forming grooves until all the waste has been removed as sawdust.

The second method which is always used for larger rebates not only saves time, as only 2 cuts are made, but it also produces a usable strip of wood as waste. Set the blade height from the marking out and make the first cut along one line. Blade height and carriage are then adjusted for the second cut (fig 3/16), making sure to sever the waste strip. Do not forget to use the push stick towards completion of the cut. To make a rebate at the edge of a wide board you will always have to make a series of passes, as the piece would not pass beneath the carriage on its edge.

fig 3/15

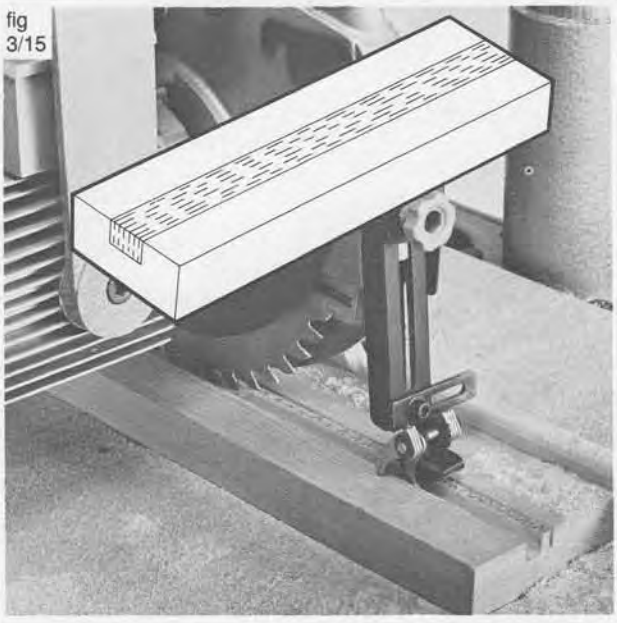
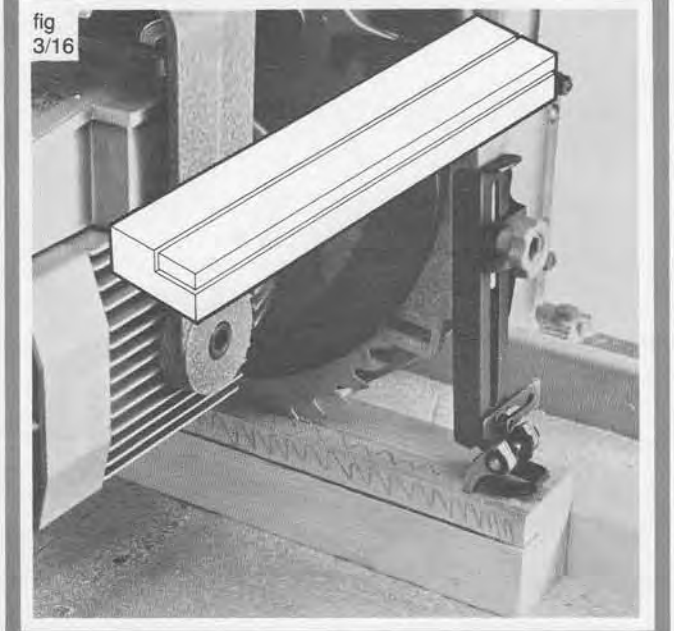


fig 3/16



Sawing Dowels

Dowels intended for joints must contain a shallow groove to allow excess glue and trapped air to escape during assembly (fig 3/17). To prevent rotation during cutting a vee block (fig 3/18) should be cramped to the table against the fence. With blade turned to in-rip position, lock the arm dead centre over the vee. Cut 1mm into the dowelling (fig 3/19) and feed the wood along the groove and under the teeth (fig 3/20). Use the same procedure if the dowelling needs to be completely cut through, with the blade lowered appropriately.

When cross cutting dowels, the vee block helps to steady the dowelling and should be cramped to the left side of the fence facing forwards (fig 3/21). A pencil mark on the table is enough to indicate the dowel length needed.

To point the ends of cut dowels see Chapter 6 on sanding attachments.

fig 3/17

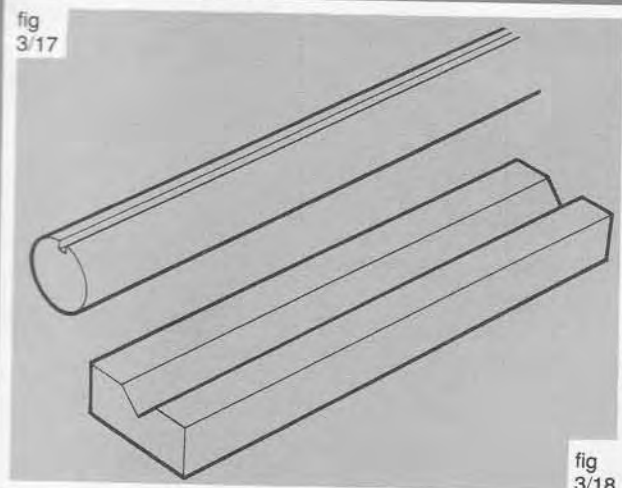


fig 3/18

fig 3/19

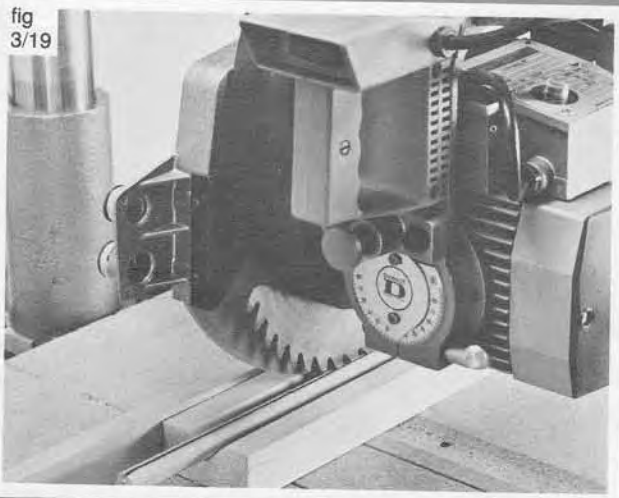


fig 3/20

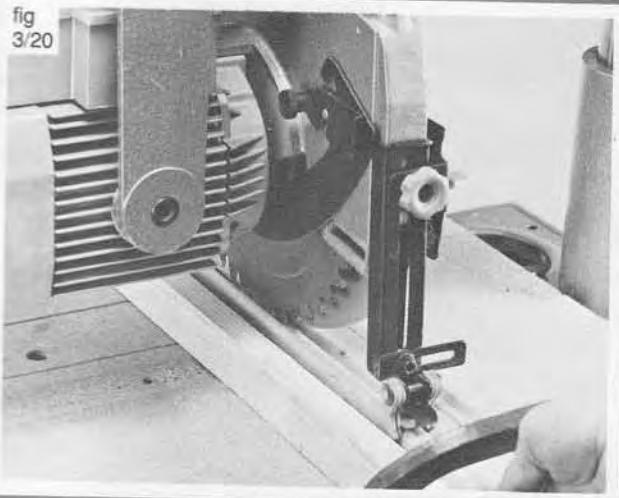
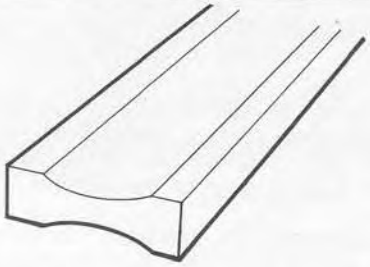


fig 3/21

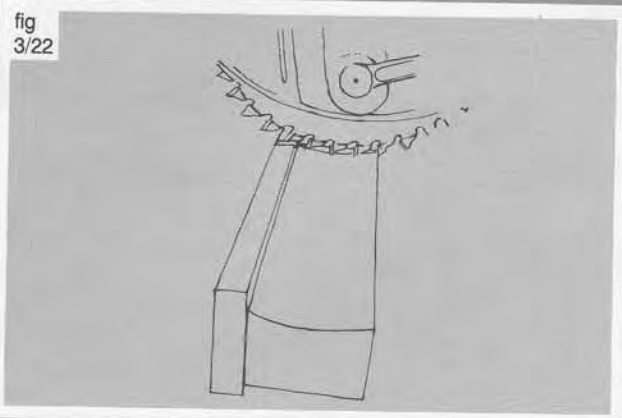
Coving or Hollowing



The ability to form hollows on wood really underlines the versatility of the Dewalt Powershop.

When a hollow is required with a curvature equal to that of the blade, then position the carriage for normal cross cutting. Lock the arm with the centre of the blade over the centre of the would-be hollow. Lower the arm

fig 3/22

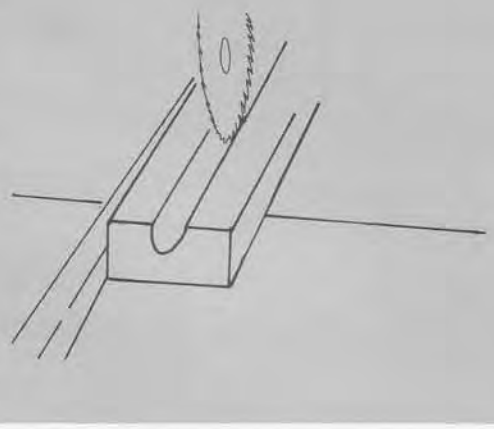


until the teeth just touch the wood. Then withdraw the wood and lower the arm by half a turn of the elevating handle. Feed the wood along the fence and under the teeth against the motion of the blade, creating a shallow hollow. It is important that the hollow is formed in stages, so the handle should undergo further half turns and the process repeated until the required hollow is formed.

To form a wide, shallow hollow, tilt the blade within the yoke with the arm in the 0° position (fig 3/22).

Then make repeated passes until the hollow is cut. To form a deep but comparatively narrow hollow, the blade remains vertical but the arm is swung round and locked at the necessary angle (fig 3/23). Trial and error on scrap is the best way to establish the correct blade setting.

fig 3/23



Dishing

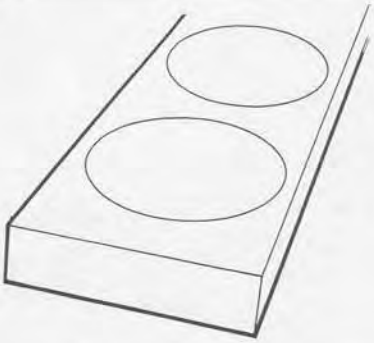


fig 3/24

While normally the preserve of lathes, it is however also possible with a Radial Arm Saw to make a circular hollow or dish in a piece of wood. With the arm set at 0° on the mitre scale, pull the sawblade forward to the front of the arm and lock it there with the rip lock. Clamp the piece of wood to the table with the centre of the sawblade over the centre line of the dish you wish to make (note: it will be difficult to determine the left/right centre point of the dish until the first cut has been made, so it is better first to form the dish in an untrimmed piece of timber and then trim up the edges as required afterwards).

Once satisfied the timber is clamped in the right position, lower the blade so that it just clears the surface. Release the bevel latch and clamp and switch on the motor. Now, holding the lower blade guard up with one hand and the rear end of the motor with the other slowly tilt the blade so that it cuts a shallow hollow in the surface of the timber (fig 3/24) and return it to 0° on the bevel scale. Then wind the elevating handle down half a turn and repeat until the dished hollow has reached the required depth.

Note: On the DW125 model, it will be necessary to use a clothes peg or something similar to keep the bevel latch disengaged while performing this operation (not shown in the photo).

It is necessary to hold both the blade guard and the other end of the motor while cutting progresses to avoid undue flexing and pressure being placed on the blade guard and its mounting.

Circle Cutting

Although a circular saw is normally thought of as only able to make straight cuts, cutting perfect circles is also quite straightforward on your radial arm saw using only the standard circular saw blade.

Cramp a false table to the main one, or substitute a strip as thick as the table itself in place of the fence. Use a woodscrew as a pin and screw this part way into the chosen aid, and then saw the head off (fig 3/25). Make a hole in the underside of the wood, from which the circle is to be formed (fig 3/26), and then fit to the pin. Lower the blade just clear of the wood,

fig 3/25

fig 3/26

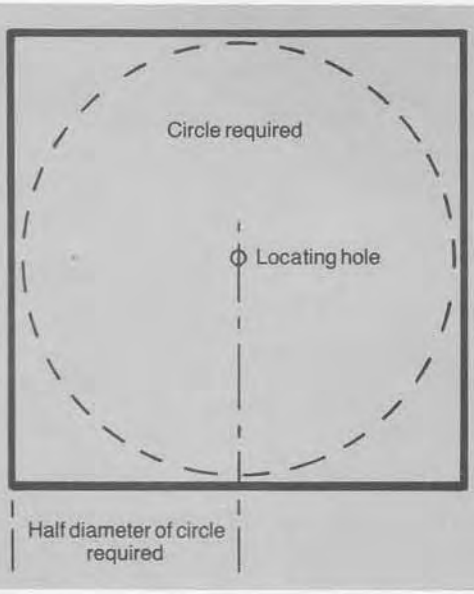
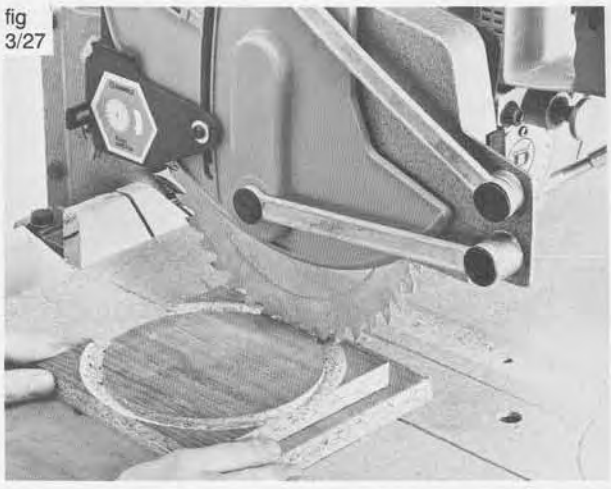
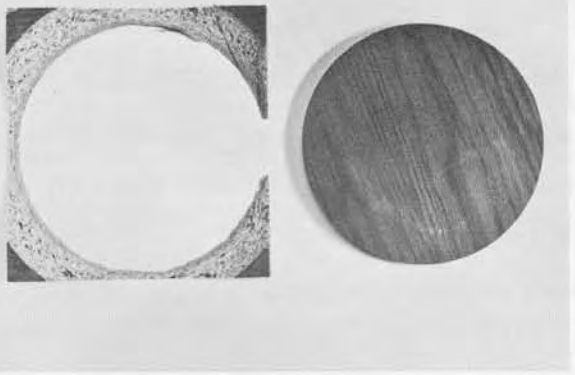


fig 3/27



and lock the carriage at a tangent to the proposed circular cut. Hold the wood firmly and lower the arm by half a turn. Then using both hands rotate the wood on the pin in a clockwise direction against the blade (fig 3/27). After each revolution lower the arm by half a turn until all the waste is cut away, and the circular piece is formed (fig 3/28).

fig 3/28



Chapter 4

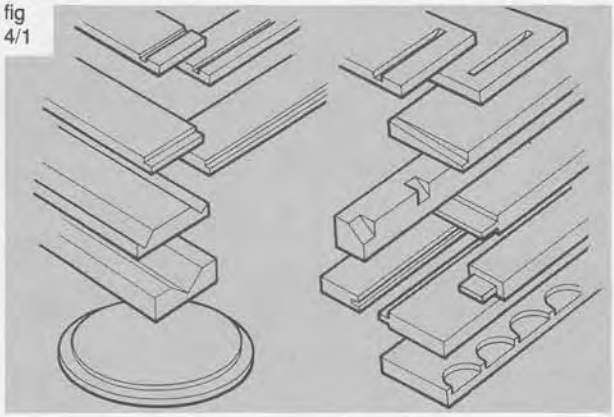
The Dado Head

CHAPTER 4

THE DADO HEAD

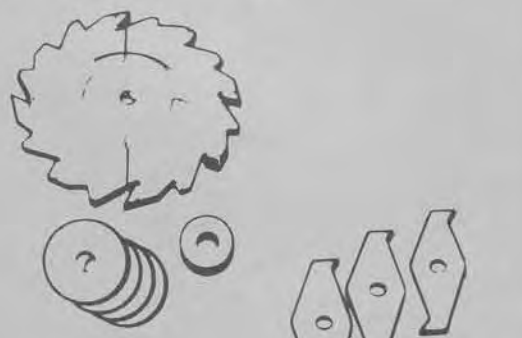
Whilst we have shown that important cuts such as trenches, rebates and grooves can be executed with a standard blade, the use of a Dado Head makes for greater speed and accuracy. In fig 4/1 we show examples of work carried out on a Powershop fitted with a Dado Head accessory. Dado Head accessories come in two kinds, premium quality and flat ground (fig 4/2). The flat-ground dado is perfectly satisfactory, but the premium head possesses exceptional precision and longevity because of its High Speed Steel (HSS) tipped blades. Both sets are available in different diameters with cutting widths from 6mm to 20mm (Note that the smaller diameter heads will require the use of a supplementary work surface placed on top of the standard table).

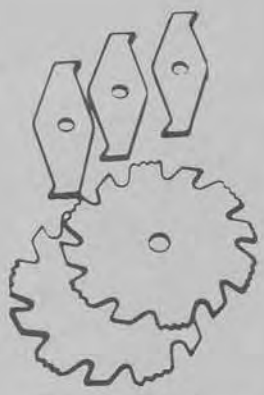
fig 4/1



A Dado Head is essentially a saw blade which can be adjusted to varying thicknesses, and therefore widths of cut.

fig 4/2 Premium quality dado head



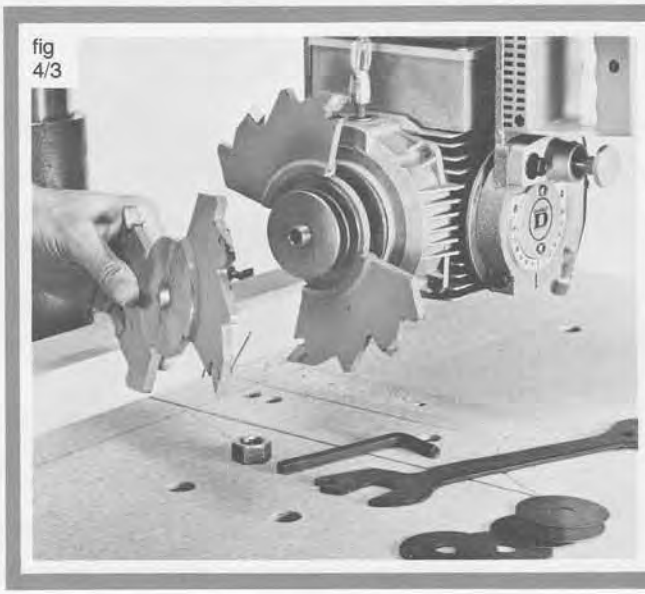


Flat ground dado head

Mounting the Premium-quality Dado Head

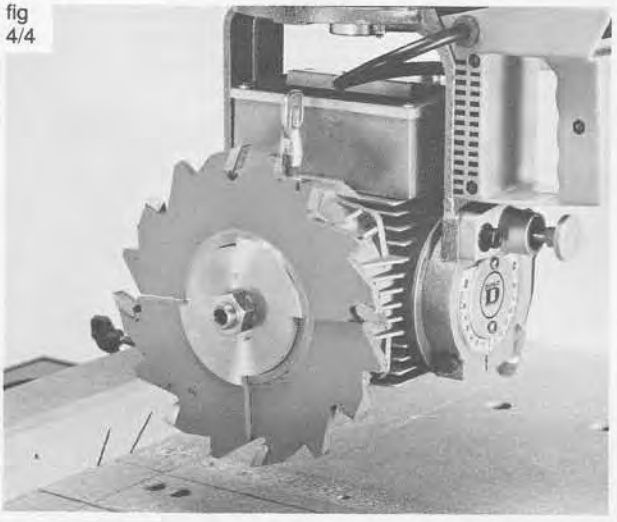
Firstly, remove all fittings from the motor arbor, and slide the special backing spacer provided onto the arbor. As the teeth and cutting direction are identical to the ordinary circular saw, the two parts of the Head cannot be reversed or interchanged. The variance in thickness of the premium quality Head is accomplished by introducing spacer washers, or shims between the two halves of the blade (fig 4/3). The spacers themselves vary in thickness down to 0.5mm, so by using different combinations the thickness can be adjusted by increments of that amount. The teeth are arranged to bridge the gap created by the spacers, so that a flat bottomed cut is always produced. When assembled ready for use, the two halves combine to form a full blade (fig 4/4).

fig 4/3



NB. With narrow Head settings the standard saw outer flange can be used in conjunction with the lock nut. With the Head fully expanded, the outer washer is omitted to allow the locknut to fully engage the thread of the arbor.

fig 4/4



Guards

The special 'Dado Head guard' for the DW125 model also acts as a safety device when the Dado Head is used in the vertical position. The guard partly rotates on its mounting for ripping (fig 4/5), but should be secured with its lower edge horizontal when cross-cutting (fig 4/6). The antikickback device should likewise be raised or removed completely when cutting across the grain.

fig 4/5

fig 4/6

The standard sawblade guard can also be used for the Dado Head when vertical or bevelled cutting is performed but it is essential first to remove the riving knife and its mounting bracket by undoing the tightening nuts (fig 4/7). However, when using the Dado Head horizontally for wide rebating or panel raising, it is necessary to employ the cylindrical guard normally intended for the Shaping Head.

fig 4/7

Cutting Trenches

It is a very wise move to not only mark out all trenches, but also to make a trial cut to ascertain the correct width setting. Making completely accurate cuts eliminates the need for subsequent adjustments. Generally the trench depth for housing joints is one third of the wood thickness, but the required depth can also be checked on the trial cut.

When making a stopped trench (fig 4/8) it is only necessary to fix a stop to limit forward movement when a large quantity are required. This is because the dado head does not climb into the work in the same way as a saw blade. In some cases though, it may be useful to fix stops to the fence to assist with the lateral location of the trenches.

Cutting mitre-angle trenches is really the same as for square trenches (fig 4/8a) being either 'through' or 'stopped'. As work possessing angled trenches frequently comes in pairs, one left-hand and one right, one piece must be cut with the arm set off-centre. The second component is then cut to the same angle on the opposite side of centre.

Note: Two pieces angle trenched to a single setting, result in identical rather than complementary components and reversing one piece does not alter this.

fig 4/8

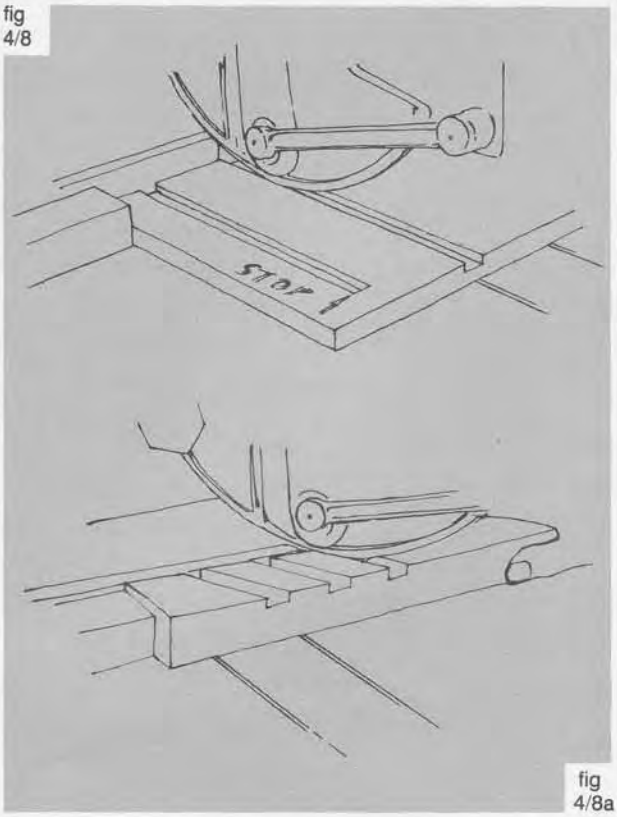


fig 4/8a

Half Laps and Tenons

The same procedure applies to cutting both of these joints. Establish the depth of cut directly from the wood (fig 4/9). Mark out with a pencil across the grain, using a marking or mortise gauge. Then cut the tenon or half lap as with a saw blade, but making rather fewer passes. Remember to cut against the shoulder first (4/10) and it is advisable to use a stop (fig 4/11). Also make a trial tenon on a piece of scrap wood, or else check the first cut very carefully for possible adjustments before proceeding.

Always cut tenons and mortises exactly up to the lines, no more and no less. Forming a tongue on the end of a piece of wood is no different from cutting a half lap joint, but move the stop clear of the blade (fig 4/12).

fig 4/10

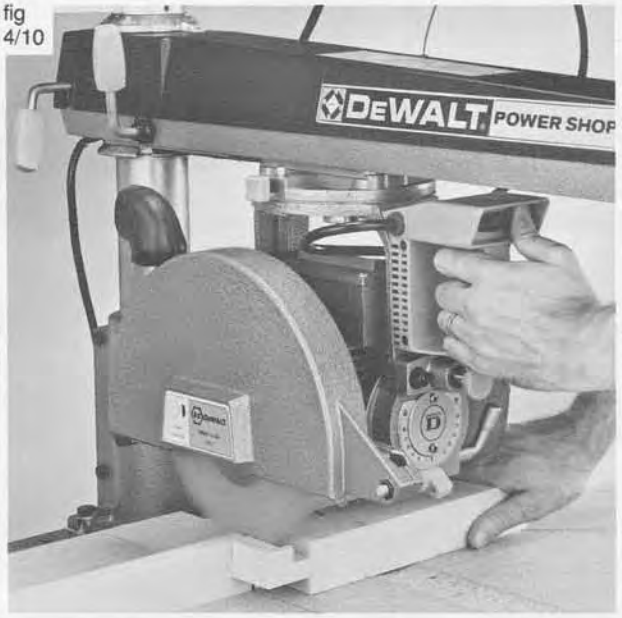


fig 4/11

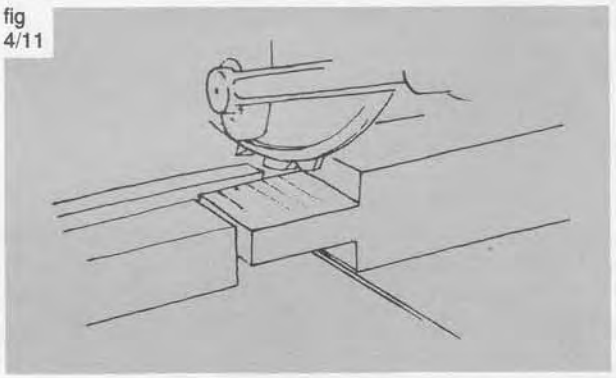


fig 4/9

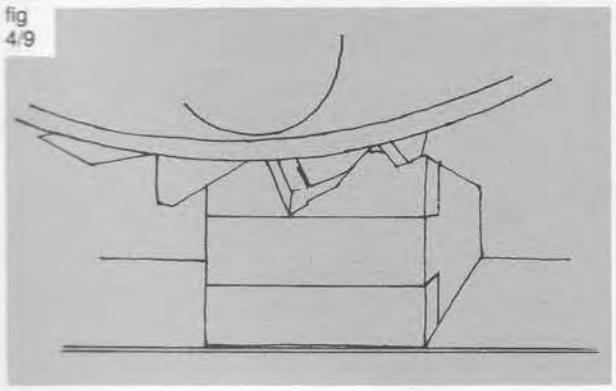
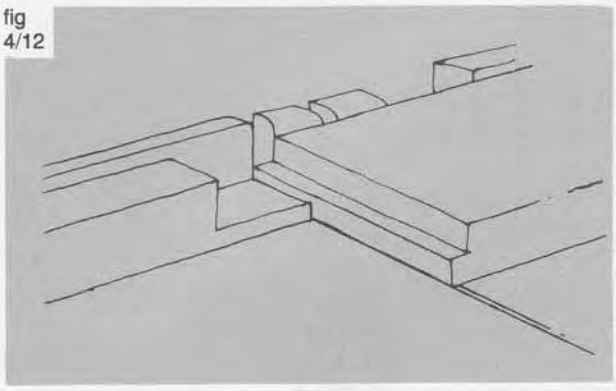


fig 4/12

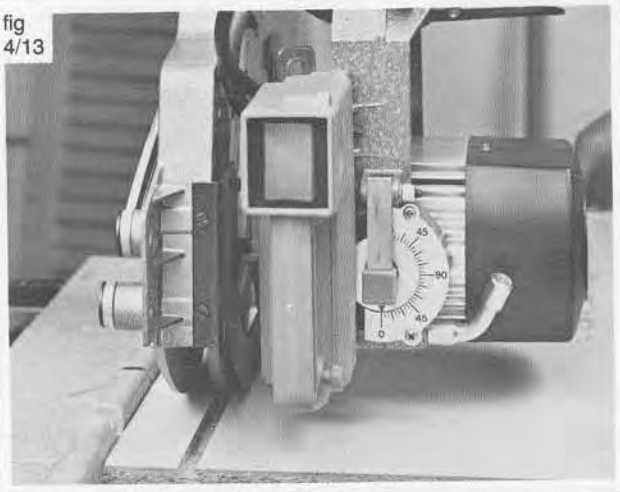


Grooves and Rebates

Grooves, like trenches, can be cut to a pre-determined width with the Dado Head. Swing the motor to the in-rip position with the arm locked at 0°.

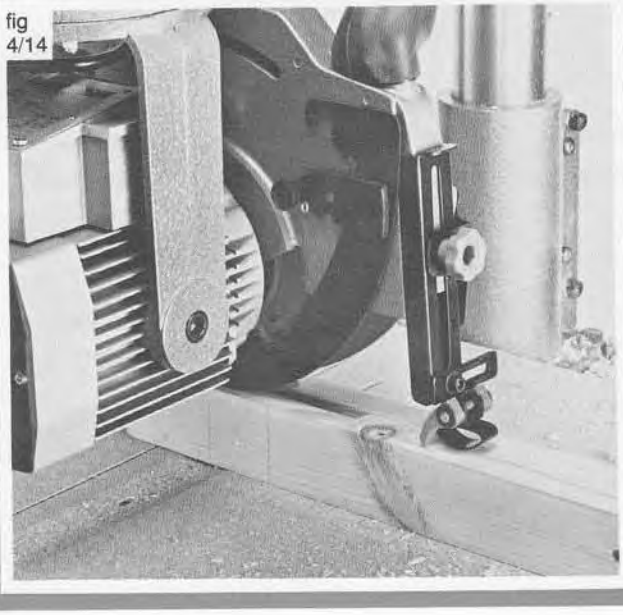
Cutting is against the direction of rotation (fig 4/13) with a maximum width of 20mm at one pass. To cut a wider groove, repeated passes must be made, when the thickness setting for the head ceases to be critical.

fig 4/13



Use the anti-kickback device to ensure forward movement only, resetting when necessary for wide grooves and repeated passes (fig 4/14). It is sensible when cutting deep grooves to make more than one pass, even if within the head's maximum capacity.

fig 4/14



To determine the depth of cut, position the arm so that the tips of the teeth just touch the wood surface, and then lower the arm by the amount of depth required or use the height gauge as suggested earlier (fig 2/10). The Dado Head must be in the vertical position for grooving. Establish the depth of cut for rebates by marking out, again verifying the first cut and the fit of any corresponding component.

Wherever possible, rebates in the 'rip' position should be formed so that the actual cutting is against the fence (fig 4/15) and it is worth making a couple of wooden 'springs' if rebating a good deal (fig 4/16). These hold the workpiece tight, and are also helpful when using the Shaping Head if you have one.

fig 4/15

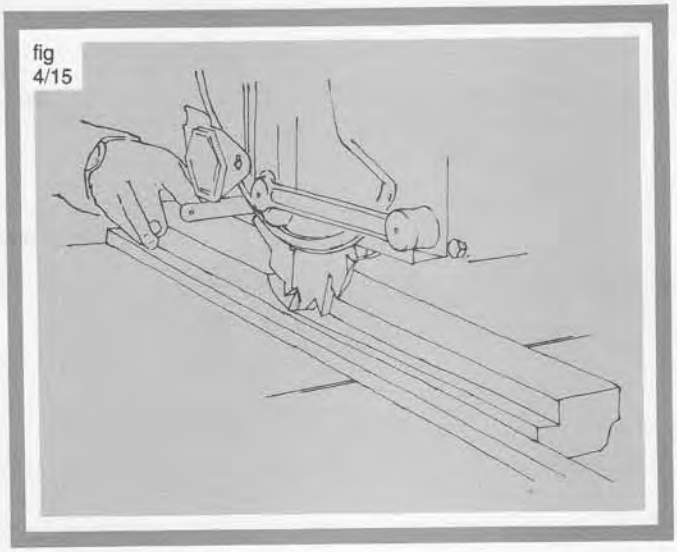
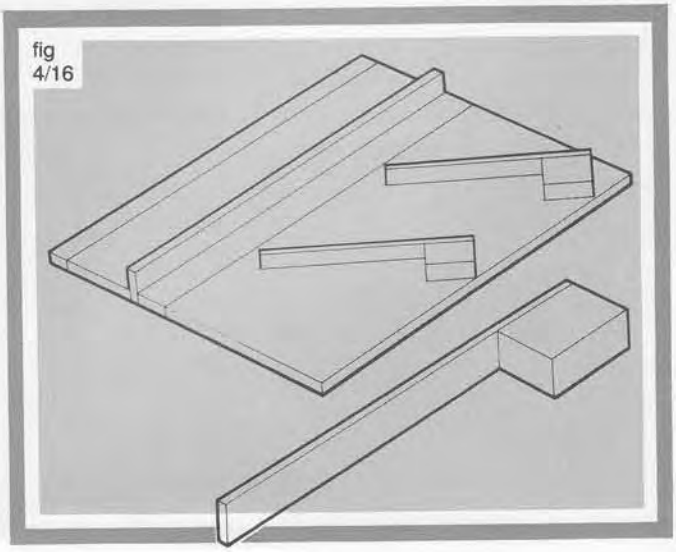


fig 4/16



Wide rebates can be cut in several ways. Make several passes with the dado set vertically as you would doing a wide rebate in the cross-cut position (fig 4/17), or cut horizontally using the cylindrical Shaping Head guard for safety. Wide rebates are commonly used for 'raised' traditional panels, when a false table and a guide strip are employed for the shorter, cross-grain cut (fig 4/18). The guide strip controls the panel moving past the cutter, where there is insufficient width to bear against the main fence. To cut the rebate with its larger surface on the slope, tilt the motor to the required angle and form the slope as a second stage to the cutting. (fig 4/19).

It is possible to form panels with a wide variety of decorative edges with the Dado Head (fig 4/20). In some cases, the sloping part is best obtained with the head being tilted out of the vertical position. The cuts across the grain should be made first to eliminate the risk of any splitting at the corners.

The edges and faces of panels can be further decorated by using either the Shaping Head or the Router Attachment.

fig 4/17

fig 4/19

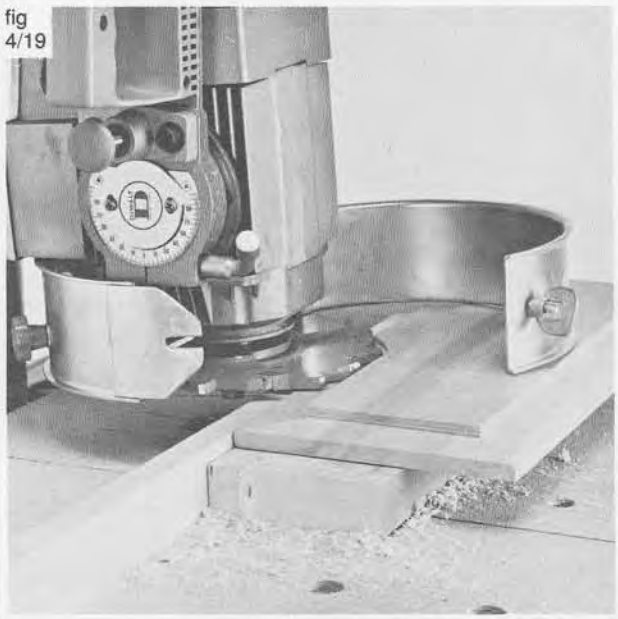


fig 4/18

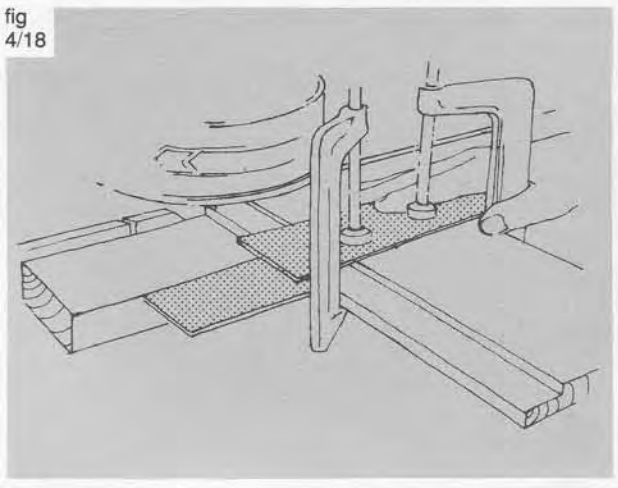
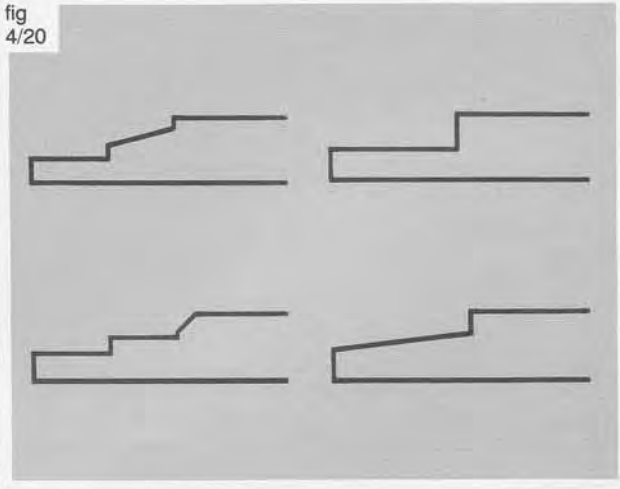


fig 4/20



Using The Flat-Ground type of Dado Head

This consists of two circular saw blades and a set of intermediate chippers (fig 4/21). The chippers come in two thicknesses to give a width of cut from 6mm to 20mm. When mounting the head, as many chippers as are necessary are mounted between the two outer blades to achieve the desired thickness. The two outer blades are interchangeable, but both these and the cutters must be mounted to cut in the direction of rotation. Use this Dado Head in exactly the same way as the premium quality one, described above.

fig 4/21

Chapter 5

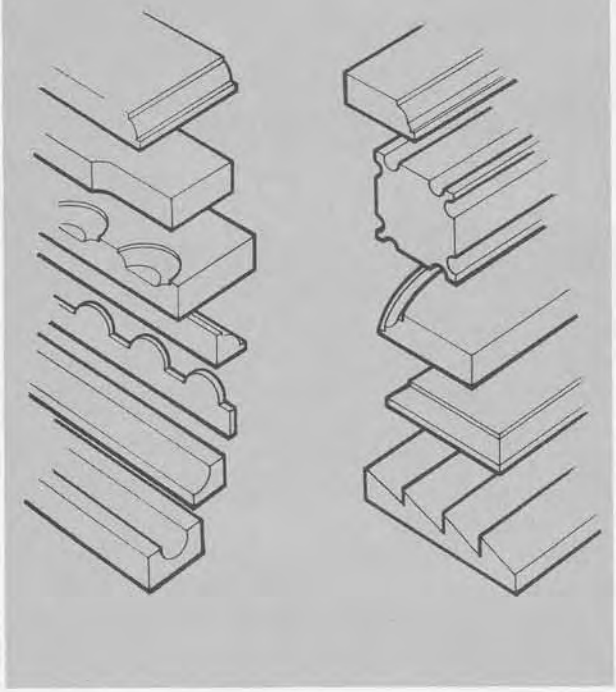
The Shaping Head

CHAPTER 5

THE SHAPING HEAD

Using a Shaping Head with your Powershop will enable you to form a variety of mouldings in a wide assortment of shapes and sizes. The range of cuts you can make depends on the knives or cutters you obtain to complement the cutterhead. As well as moulding, the cuts which can be made include rebating, tonguing and grooving, and the simpler treatment of edges, such as rounding or hollowing. Furthermore, with the use of simple home-made devices, these cuts can be made on edges which themselves are convex or concave. Fig 5/1 shows the kind of work which can be carried out with this attachment.

fig 5/1



The most popular way of obtaining these moulding facilities is to buy the optional Dewalt Shaping Head Set (fig 5/2) which includes a starter set of knives, plus the cutterhead or moulding block (fig 5/2a) into which they fit. The premium-quality set comes complete with storage case which has space for additional knives which can be bought separately. To ensure the cutterhead is balanced and the cutting action is evenly distributed, the knives are always used in matched pairs.

Note: The Shaping Head referred to here is described as being of 'premium quality'. Dewalt also offer a lower-cost general-duty shaping head (fig 5/3) for which the following principles are equally valid.

fig 5/2

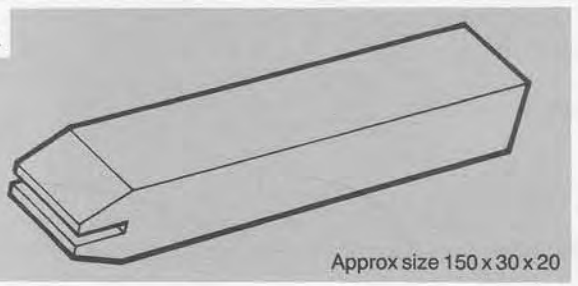
fig 5/2a

fig 5/3

Sharpening the Knives

Blunt knives cause vibration when cutting, and the surface quality produced lacks the 'cleanness' of well-machined work. Therefore, maintain a keen edge on your knives using a rectangular oilstone, plus a selection of variously shaped smaller stones to suit the shape of the cutters involved. Make a simple knife holder for use when honing the knives (fig 5/4).

fig 5/4



When sharpening flat knives, rub them over the stone, putting pressure towards the tip of the blade without changing the sharpening angle (fig 5/5). Alternatively, hold the knife still and rub the stone across it (fig 5/6). Usually only a small amount of rubbing is required, and a slight burr on the back of the cutting edge indicates completion. Remove the burr with a few strokes on the reverse side (fig 5/7), holding the stone perfectly flat on the blade and the bevel confined to one side only.

Sharpen shaped knives by rubbing the stone across the blade, preferably with the knife holder gripped in a vice (fig 5/8). Some knives require the use of more than one stone, because of their shape, but in all cases a final flat rubbing to remove the burr on the reverse side is essential.

fig 5/5

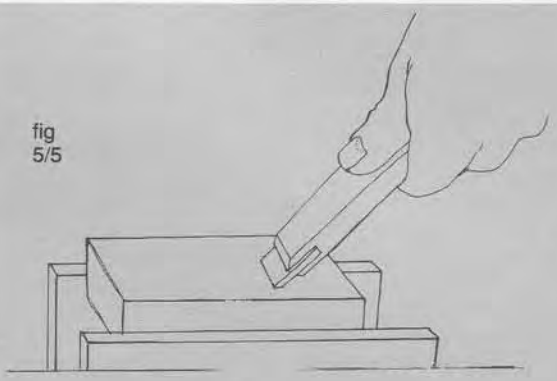


fig 5/6

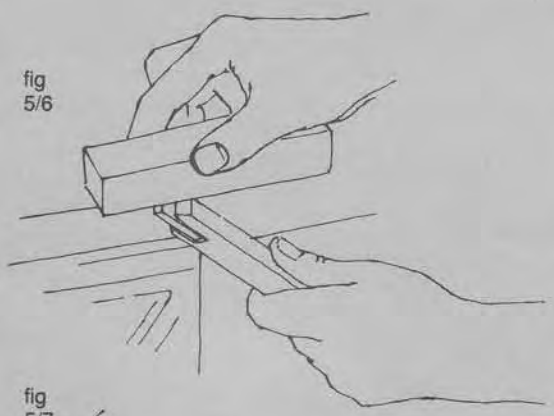


fig 5/7

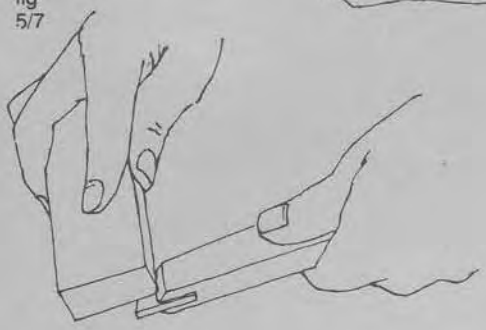
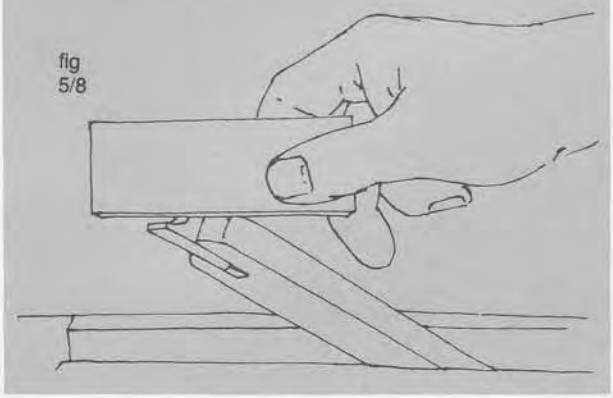


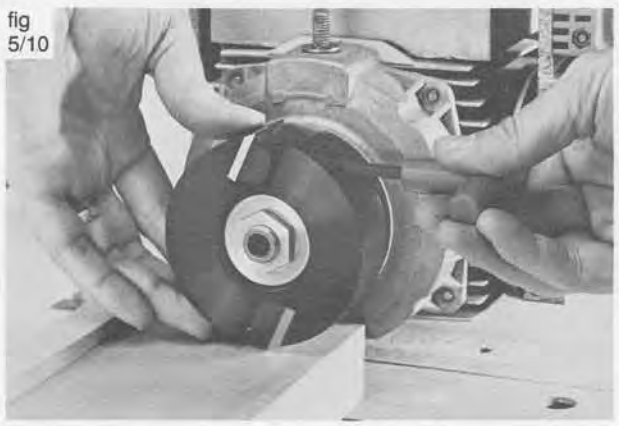
fig 5/8



Mounting Shaping Head and Knives

Firstly remove the guards and other items attached to the motor arbor. If a special back spacer is not provided with the Head, the normal sawblade back spacer can be used. This is mounted onto the motor shaft, followed by the cutterhead with its special locknut inserted to compensate for the difference in bore between cutterhead and shaft. Use the special box spanner and Allen key to tighten the locknut within the head (fig 5/9). A block is useful to establish the projection from the head when setting the knives. To set the knives lock the arm in centre (0°) position and the carriage at a suitable point along the arm. Adjust the arm height so that the block of wood will slide beneath the knives, which are then slackened slightly with the Allen key (fig 5/10). Adjust the knives so that they barely skim the wood, as the cutter block is rotated by hand. The aim is that the knives should project equally to do the same amount of work. Unbalanced knives result in visible ripples on the wood as 'cuts per minute' are halved. The special Shaping Head guard must be fitted (fig 5/11), which is centre-hinged for convenience.

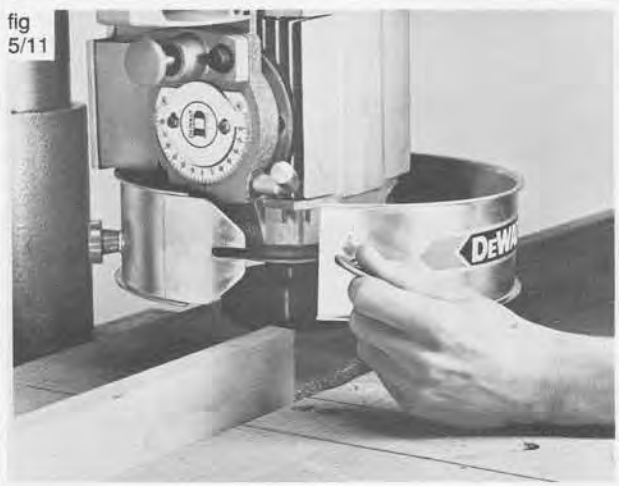
fig 5/10



NOTE: FOR VISUAL CLARITY ONLY, THE GUARD IS NOT SHOWN IN PLACE IN MANY OF THESE ILLUSTRATIONS.

fig 5/9

fig 5/11



Straight Mouldings

It is a common mistake at first to align knives in a cutterblock with the shape drawn on the wood (fig 5/12). In this position, the cutter is not at its maximum projection to the fence and to the cut to be made. As the knives are mounted tangentially, the maximum cut is made when the imaginary line between the tip of the knives and the axis of rotation is at right angles to the surface being cut (fig 5/12a).

Carry out moulding with the motor locked vertically to the arm, giving the correct projection of the knives beyond the fence, and with the arm at the appropriate height (5/13). It pays to make an initial cut smaller than required, even on a trial cut, and then to adjust until the exact outline is obtained.

Usually to cut wood of average thickness, the fence will have to be cut for the knives to protrude sufficiently. Alternatively, construct a fence in two halves, with a gap in the centre for the cutterhead (fig 5/14).

Where the lower part of the edge is being bevelled,

it is advantageous to use a false table to keep the knives above the main table.

When moulding all the edges of a wide piece, firstly cut across the grain to avoid slight splitting at the corners of the finished product. Mould narrow pieces in the same manner as with a Dado Head, particularly when the fence is cut away in the centre. Fig 5/15 shows the correct sequence of passes to shape all 4 edges, in each case from right to left. Cuts 3 & 4 are made parallel to the grain thereby removing end imperfections from the cross grain passes.

When moulding an edge, never completely remove the original edge (fig 5/16), otherwise there will be a dangerous lack of the surface which bears against the fence. Also the edge will have a distinct step in it.

To mould work of small section on opposite sides, such as glazing bars, a supporting jig needs to be made. (fig 5/17). Cut the lower rebates first (see note below), then mould the edges whilst the jig supports the work.

fig 5/12

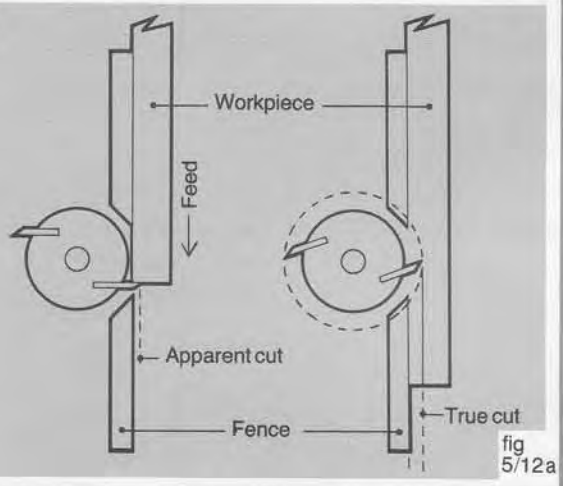


fig 5/12a

fig 5/13

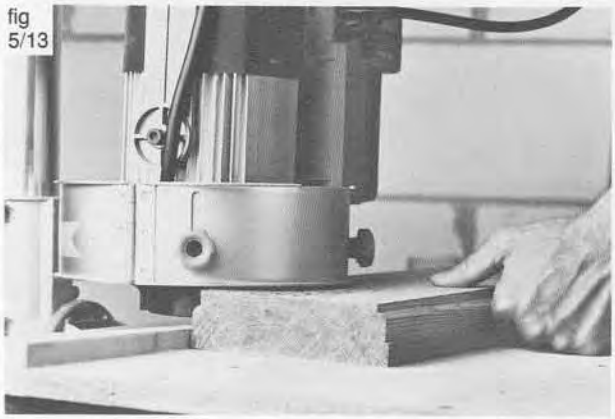


fig 5/14

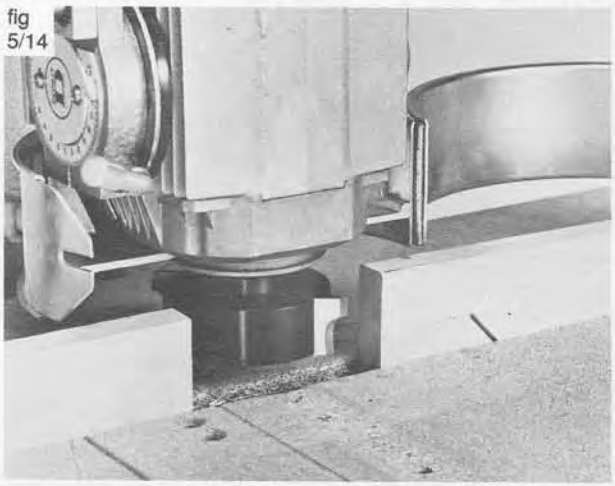


fig 5/15

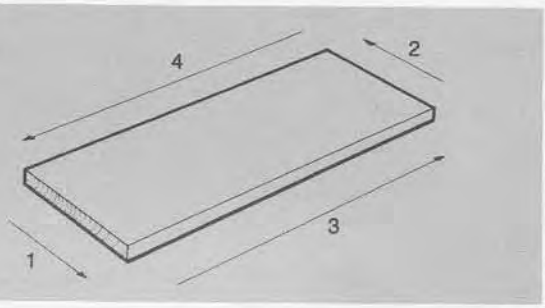


fig 5/16

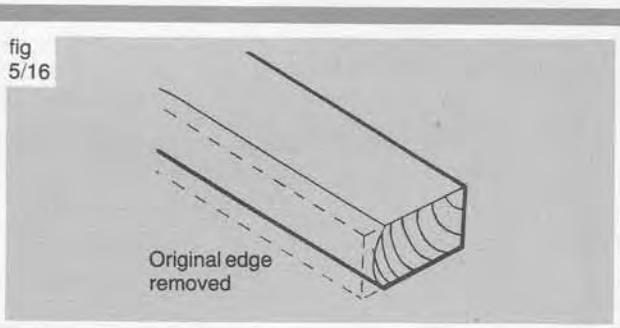
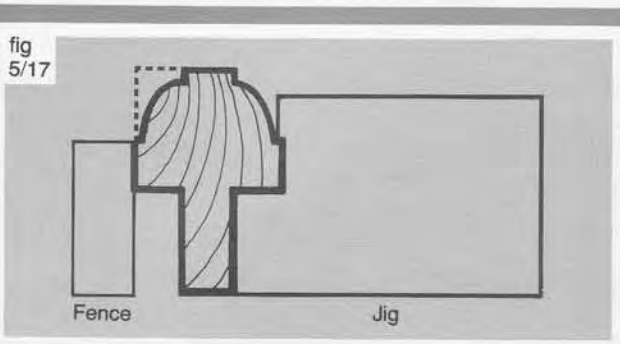


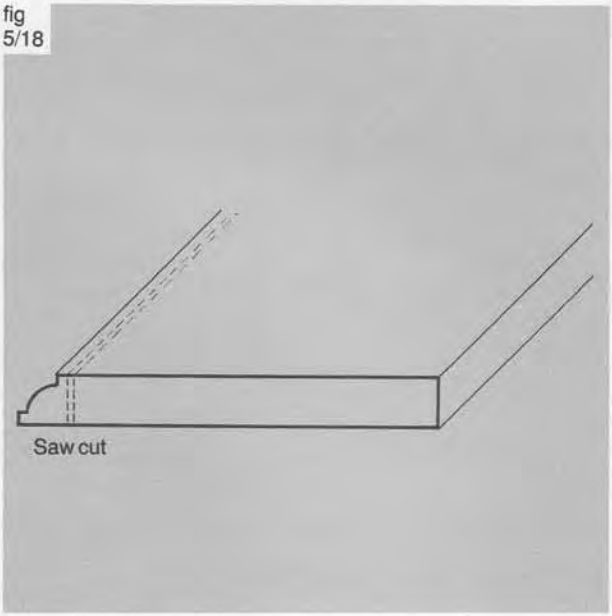
fig 5/17



Narrow Mouldings

Narrow pieces of wood are difficult to hold due to flexibility, so always prepare small size mouldings from a wide board with thickness equalling one of the dimensions of the moulding. Then form the moulding on the edge of the board (fig 5/18), after which saw off to give the section or strip required. For speed, work from both edges of the board.

fig 5/18



Rebates

Cut rebates in essentially the same way as mouldings, with the cutterhead providing another method of making this cut (fig 5/19). When cutting multiple rebates, as in glazing bars remember they have to be made on the upper surface.

fig 5/19

Tonguing and Grooving

The fundamentals of these cuts are similar to straight mouldings (fig 5/20). Since the two cuts have to match, mark the face surface of all pieces, so that all machining is then done relative to these faces. After sharpening, adjust the knives within the Head to ensure the depth of groove is slightly greater than the projection of the tongue. Thus the tongue will not restrict the assembly of the joint. Support the wood with a false table when forming the tongue, to correctly align it with the edge. Cut both tongue and groove so that part of the original edge remains uncut. (fig 5/21).

fig 5/20

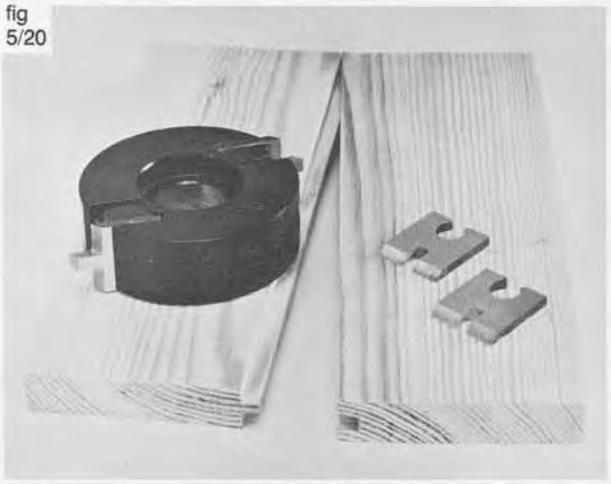
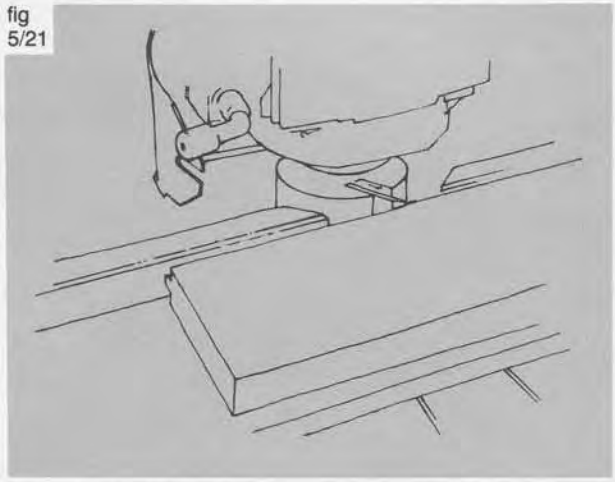


fig 5/21



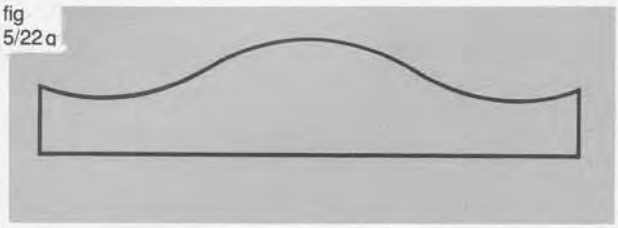
Curved Work

The Shaping Head tackles convex or concave curved work very easily. Make a simple jig out of plywood to act as a fence. Form one end of a piece around 250mm x 150mm into a gentle curve. If the edge of the piece is concave then the diameter of the curve must be smaller than the piece itself. Secure the jig to the table with its centre in line with the motor axis.

Carefully set the arm height and the carriage position to give the cut required (fig 5/22). Keep the wood in contact with the fence when cutting. Work which is convex or has compound curves is moulded using the same curved fence. (fig 5/22a).

fig 5/22

fig 5/22a



Perfectly circular work may also have a moulded or rebated edge, where a different kind of fence is utilised. Make 45° cuts at the end of two 13mm thick pieces of ply (fig 5/23) and fix symmetrically to the table relative to the cutterhead (fig 5/24).

When this fence is infrequently used simply pin the ply to the table. Otherwise screw the ply to a false table and then cramp this to the main one.

To start the cut, roll the disc gently along the right hand fence and into the knives. Contact with the left fence will then prevent further movement. Rotate the disc anti-clockwise to complete the cut. For a deep cut, or if the wood is very hard, the operation is best executed in stages by varying the arm height, or the carriage position on the arm, depending on the job.

fig 5/23

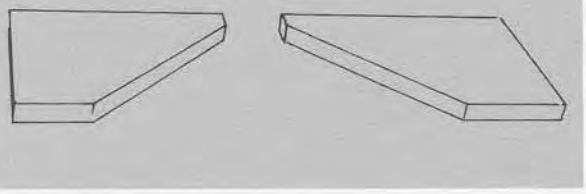


fig 5/24

Chapter 6

Disc & Drum Sanding

CHAPTER 6

THE DISC AND DRUM SANDING ATTACHMENTS

A smooth surface is an essential factor in the vast majority of woodworking projects, before the application of polish, varnish, lacquer and even paint. The two Powershop sanding attachments are the Disc and the Drum. The Disc Sander is particularly used for trimming, especially on end grain, but can also be used for sanding the face of work, but then only when the job is to be painted. Disc sanders tend to leave slight circular marks which are likely to be visible under a clear finish. Drum sanders on the other hand do not leave behind any tell-tale marks.

The abrasive supplied as an accessory in the replacement packs is aluminium oxide, which is versatile enough to smooth diverse materials like plastic and wood. It also possesses a long life owing to its extreme hardness. Three grades of disc are supplied in the accessory pack – coarse, medium and fine. Though coarse abrasive is fast-cutting, the quality of the finish is in direct relation to the size of the grit particles. The finer grades of abrasive are slower but produce a smoother surface.

Some woods such as resinous softwoods tend to clog abrasives; causing the paper on the Disc or Drum to glaze over and cease cutting. If this happens, switch off the machine and clear the surface using a wire brush. The life of the abrasive paper can be extended by the use of such a wire brush, and also by not overtaxing it. Use these attachments for final sanding and smoothing only, and not for example to produce a bevel but simply to trim a bevel once it has been cut by the saw.

With the Disc Sander, mount the self-adhesive abrasive sheets to the centre of the disc, and apply hand pressure to bond. When removing worn sheets scrape away all traces of paper and adhesive, leaving the surface clean and flat.

For much of the time the disc is in use, the workpiece will need to be supported by a false table, which should be roughly in line with the disc centre.

Specially-prepared sheets of abrasive paper, measuring 240mm x 75mm are available for the 63.5mm diameter Drum Sander. A block of wood 198mm x 75mm is also required to bend the ends of the cut pieces before sliding onto the drum. Make sure that the oval locking-tube draws the ends of the sheet tight into the drum when rotated.

Mounting the Sanding Attachments

fig 6/1

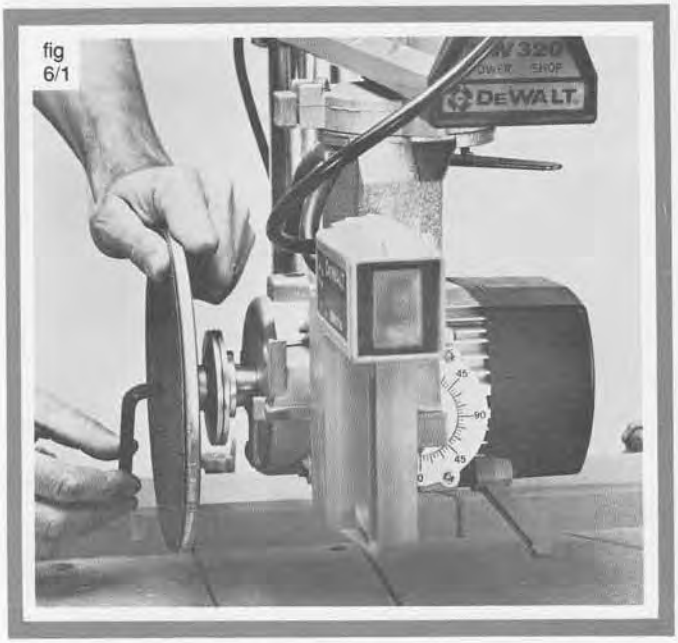
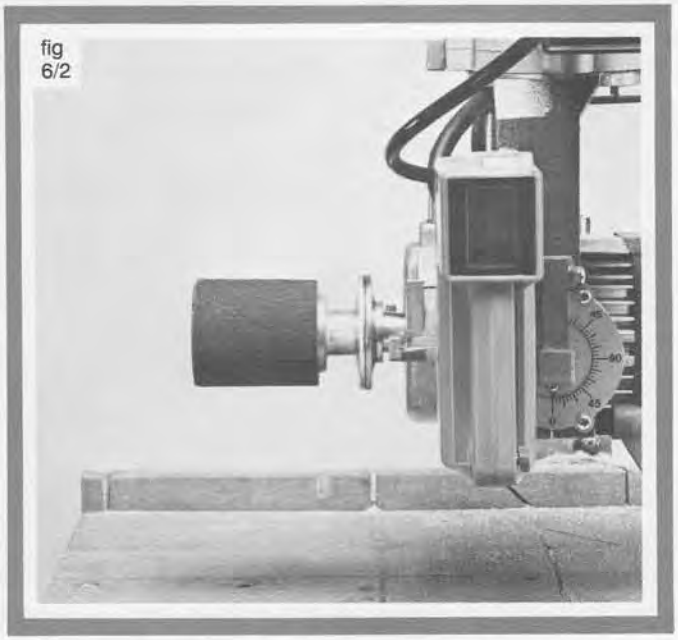


fig 6/2



These screw onto the exterior thread of the motor arbor. Having removed the sawblade, place the sawblade flanges flat against each other on the shaft and then screw the Disc or Drum Sander against the outer flange. (Fig 6/1 & Fig 6/2). The Drum Sander requires no guard but, when using the Disc Sander for horizontal flat sanding, it is recommended that the Shaping Head guard is mounted to cover the shaft behind the disc, and then adjusted so the abrasive paper protrudes just beyond its edge.

End Trimming and Shaping

When trimming with the Disc Sander, remember that only the front half of the disc can be used. The forward half of the disc rotates downwards, holding the wood in place against the table and making control safe and easy. As the rear half is moving upwards however, using that side of the disc will result in loss of control as the workpiece is lifted from the table.

For convex shaping, the wood must first be cut as described in the Sabre Saw Attachment chapter. For final smoothing, press the wood gently against the disc whilst pivoting by hand to produce a uniform curve (fig 6/3). Where ends need to be smoothed but kept square, then secure a fence to the table so that work is held at right angles to the disc (fig 6/4). Move the carriage slightly from time to time to even the wear on the abrasive, if you are performing a good deal of this sort of work. A similar procedure is adopted when sanding ends where the angle is other than 90°. If the angle is close to a right angle then adjust the fence by a few degrees, otherwise swing table and fence round to the angle required (fig 6/5).

fig 6/4

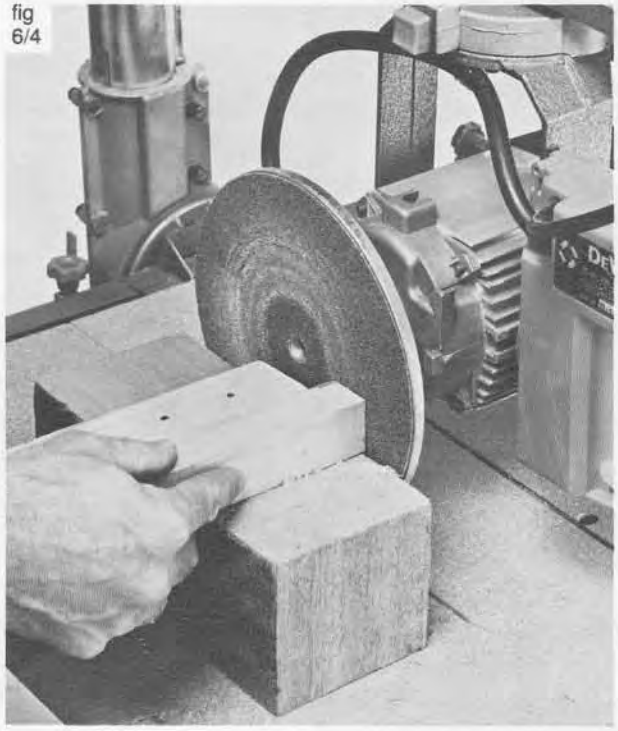


fig 6/3

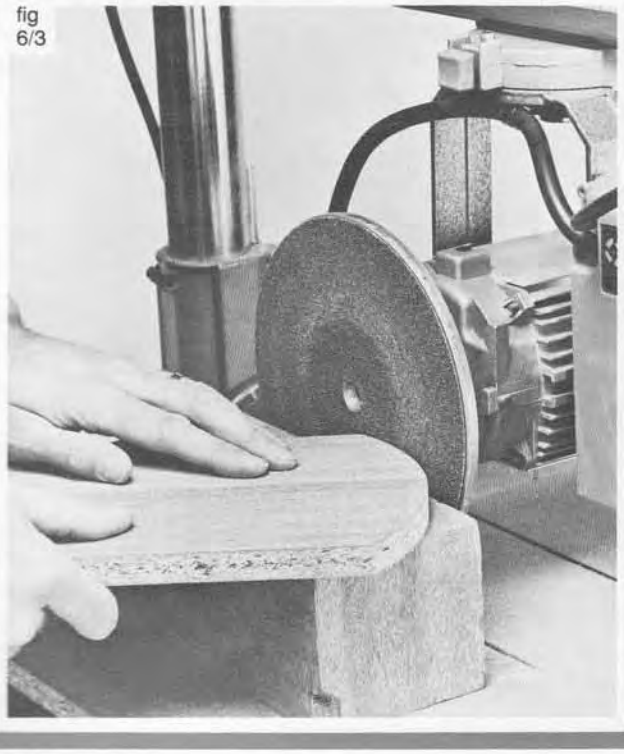
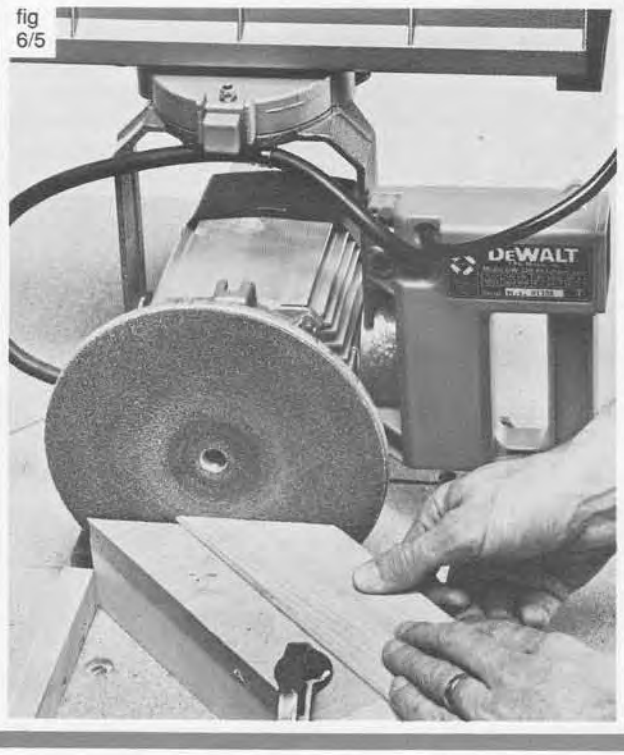


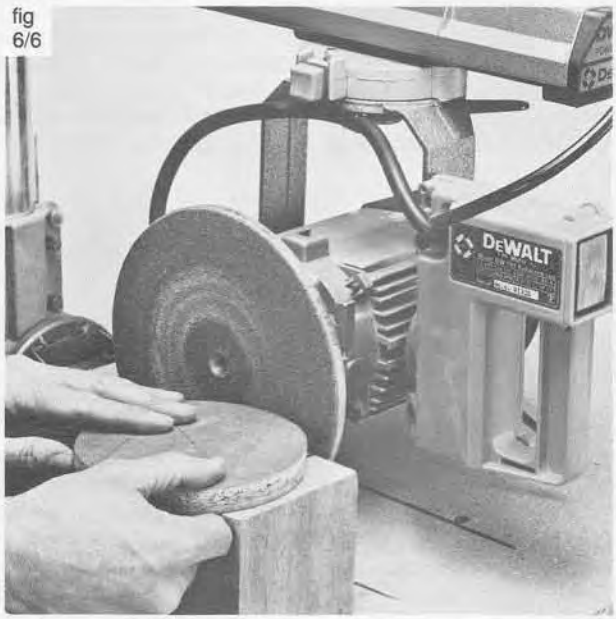
fig 6/5



Sanding Wooden Circular Discs

When sanding large numbers of discs employ the pivot-pin principle, with the pin fixed so that the wood can rotate. This produces work which is totally true. If the wood has already been cut utilising the pin technique, then a suitable hole will already have been made. Where only a small amount is to be sanded off, the initial location of the wood on the pin will be difficult. Overcome this by swinging the arm to the right, and then placing the wood on the pin. Switch the motor on and then holding the wood with one hand, swing back the arm against the wood and lock at the normal 0° setting. With both hands rotate the disc slowly, and keep it moving, while you switch off the motor, until the sander has come to rest. (fig 6/6).

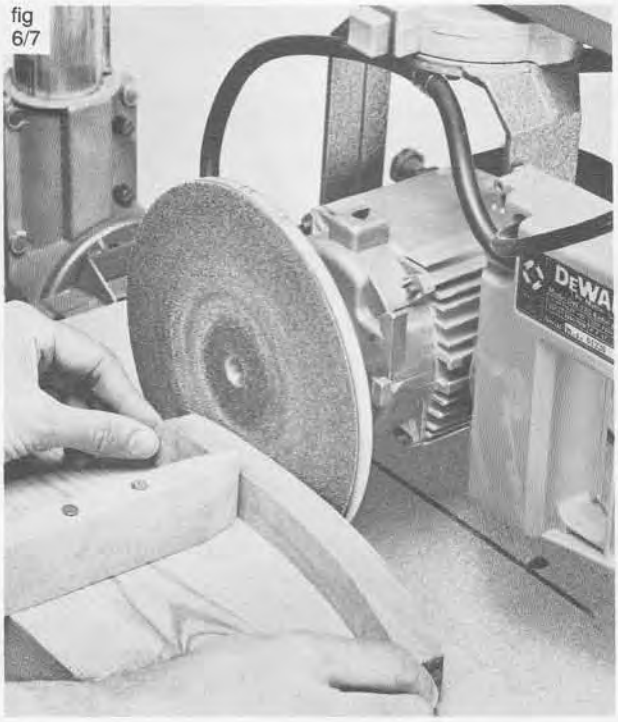
fig 6/6



Profile Sanding

The Disc Sander can be used to achieve uniformity when one edge of a work is concave, the other convex. Use a piece of wood about 50mm x 20mm with one end rounded, as the guide. Secure it to the table so the distance between the rounded end and the disc equals the desired thickness for the wood. Feed the work between block and disc until the excess wood is sanded away (fig 6/7).

fig 6/7

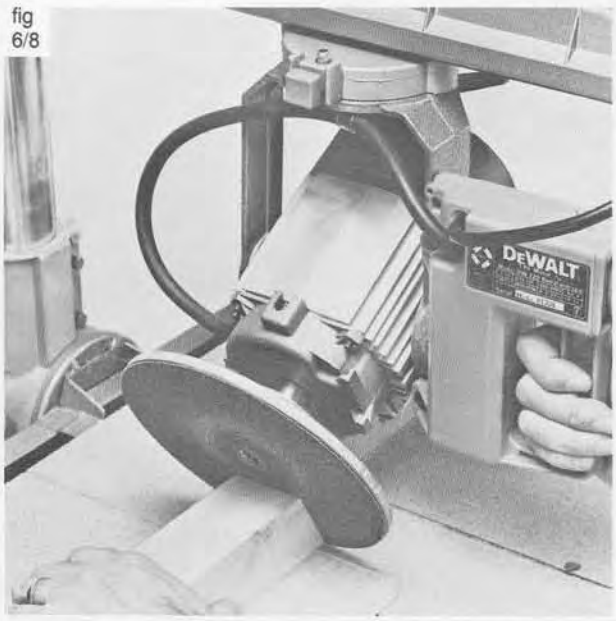


Trimming Ends of Wide Material and Angle Sanding

Smoothing the ends of wide pieces of wood requires a different method than for small stock. Hold the work against the main fence, but raised a little on a false table. Set the machine for cross cutting, and adapt the fence so that the disc moves freely to and fro through it. Holding the wood with the left hand, move the carriage along the arm with the right, enabling the disc to smooth the end of the workpiece (fig 6/8).

Angle sanding is similar to that for smoothing square the ends of large pieces. Swing motor and disc to the angle required, but avoid pulling the carriage too far forward for fear of lifting the wood with the rear half of the disc.

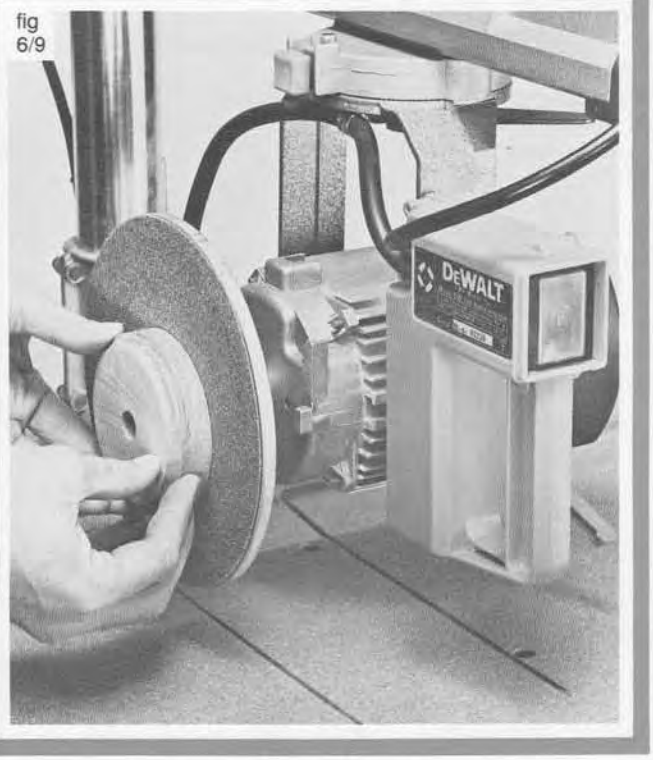
fig 6/8



Face Sanding of Small Pieces

Simply hold the face of the work against the disc, taking care to keep the fingers clear of the abrasive. Also move the wood a little during sanding (fig 6/9) to ensure a smooth, even finish.

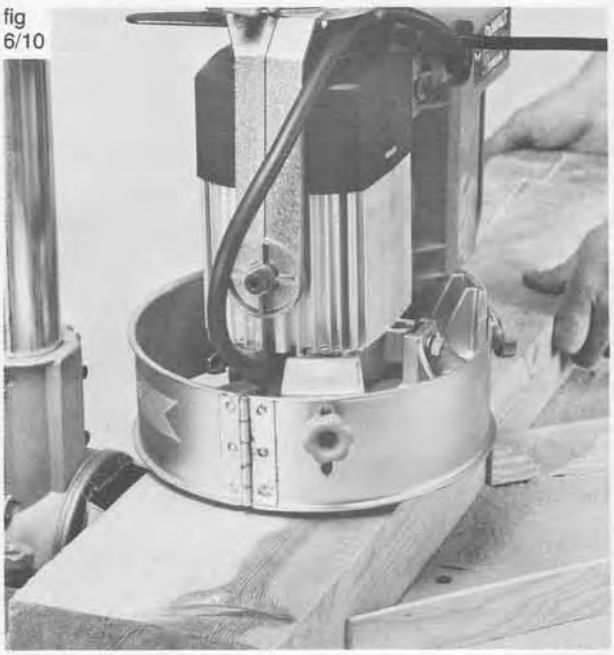
fig 6/9



Face Sanding Wide Work

Swing motor to the vertical position and then lower so the wood just passes beneath the disc. Having fitted the cylindrical guard (normally used for the Shaping Head), sand the surface by lowering the arm fractionally by a part-turn of the handle, passing the wood along the fence and under the disc. For wide pieces, position the carriage for a second pass. Use wooden pressure springs to hold the wood against the fence (fig 6/10), and ensure the wood is uniform in thickness. Though quite smooth, the resulting surface quality is best suited for a painted finish.

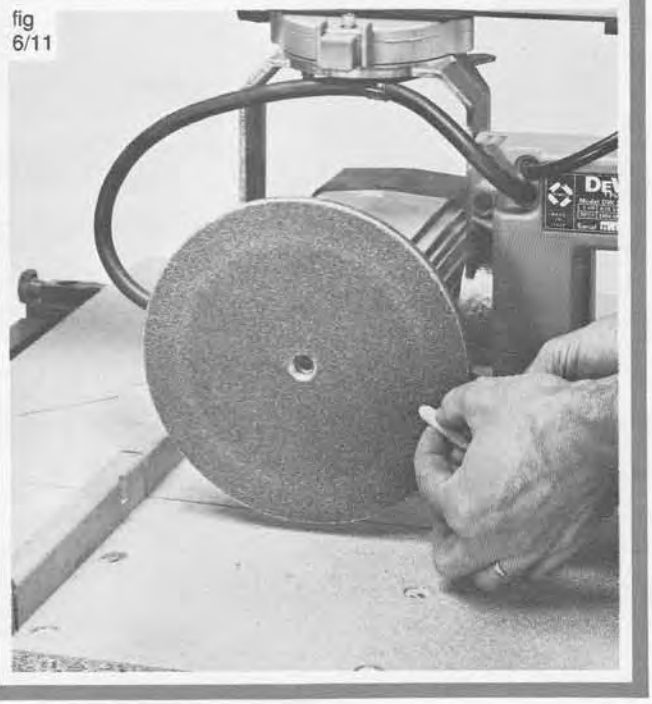
fig 6/10



Pointing Dowels

When used in joints, dowels should be slightly pointed. Some craftsmen prefer both ends lightly chamfered. Others chamfer one end and then drive the square end into one part of the joint. To do this spin the dowel with fingers applying only a light pressure (fig 6/11) against the rotating disc.

fig 6/11



Concave Sanding with the Drum Sander

Lock the motor in the vertical position and move the work past the drum from right to left, keeping to a uniform pressure and speed of movement (fig 6/12). Unsteady handling will result in an uneven surface.

Edges of compound curvature can be smoothed in similar fashion (fig 6/13). The outline must be carefully followed to avoid a wavy edge. The use of a Drum Sander for edge smoothing underlines the need to saw waste a uniform distance from the marked line during initial preparation of work pieces.

The Drum Sander conveniently smooths completely internal cuts. First raise the arm so work can be positioned round the drum, after which proceed as for concave sanding (fig 6/14).

Where the drum is in the vertical position, some people prefer it to be lowered below the table top. Either enlarge the existing small cut-out in one of the rear table sections if there is one. Otherwise substitute distance pieces for the fence and one of the movable table sections (as in fig 6/13).

fig 6/13

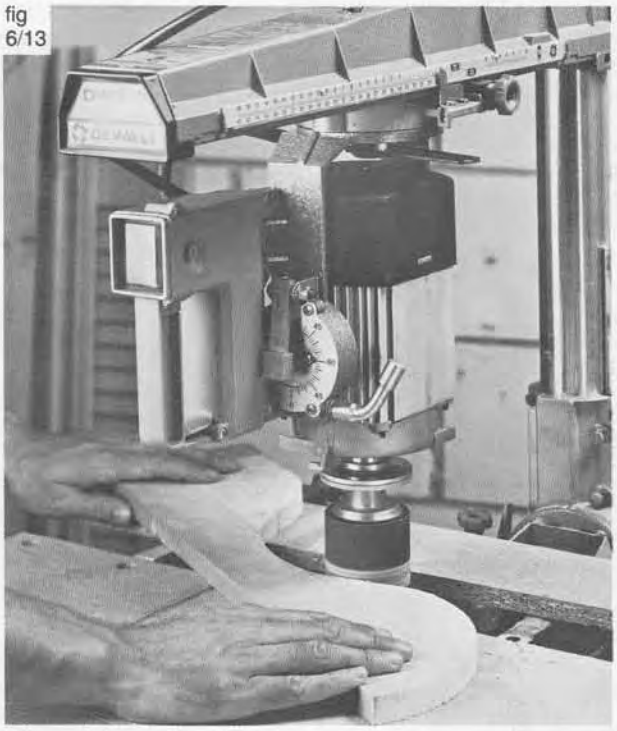


fig 6/12

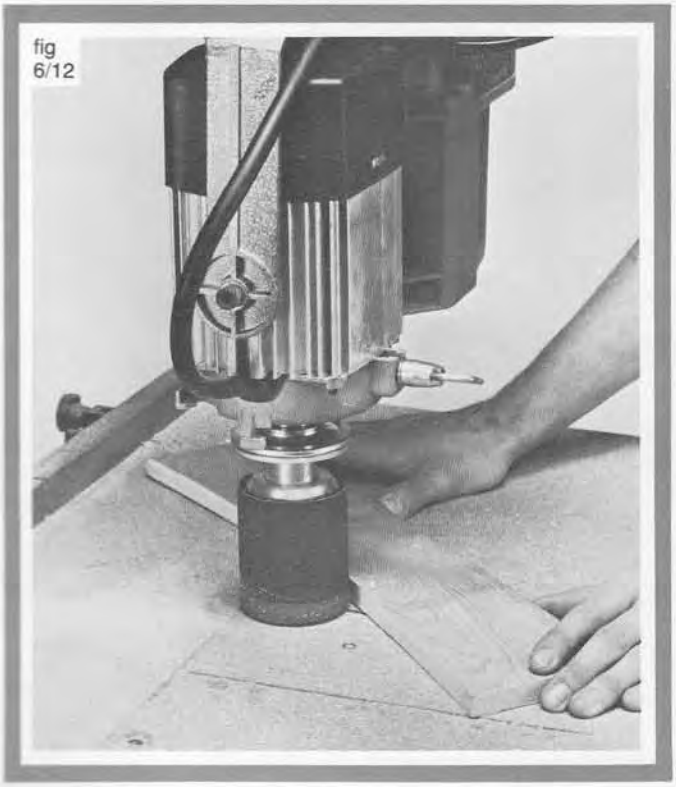
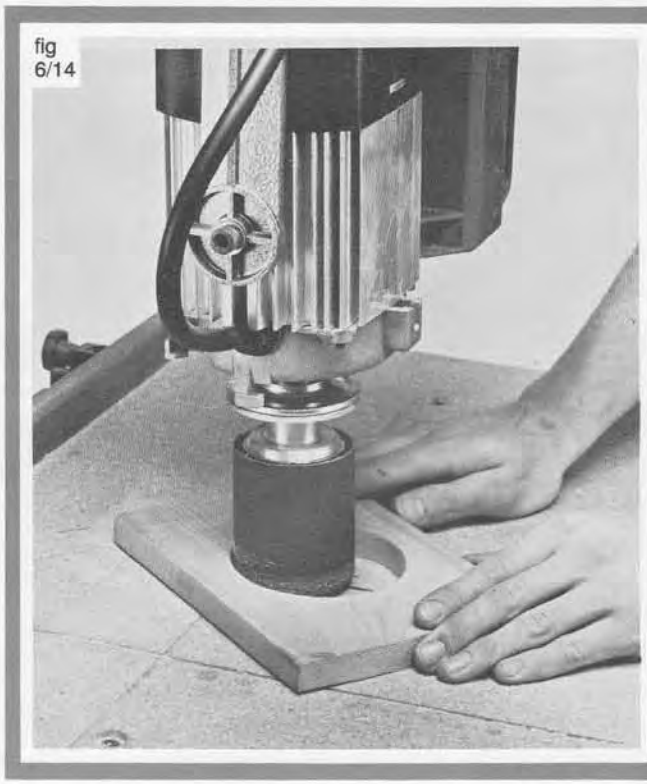


fig 6/14



Face Sanding with the Drum Sander

Although confined to use on fairly narrow pieces, this does not leave circular score marks as does disc sanding. Set the drum facing the column in the horizontal position, with the height adjusted to the size of the wood. Engage all locks and lower the arm so that the drum lightly abrades the wood (fig 6/15). Heavy passes should be avoided when sanding, therefore two light passes are better than one heavy one. A similar set-up can be used for sanding rebates (fig 6/16), and raised panel edges.

fig 6/15

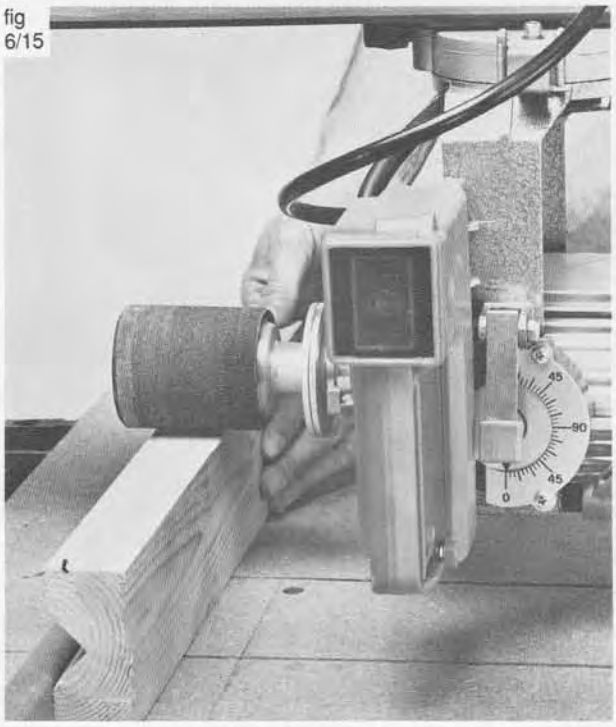
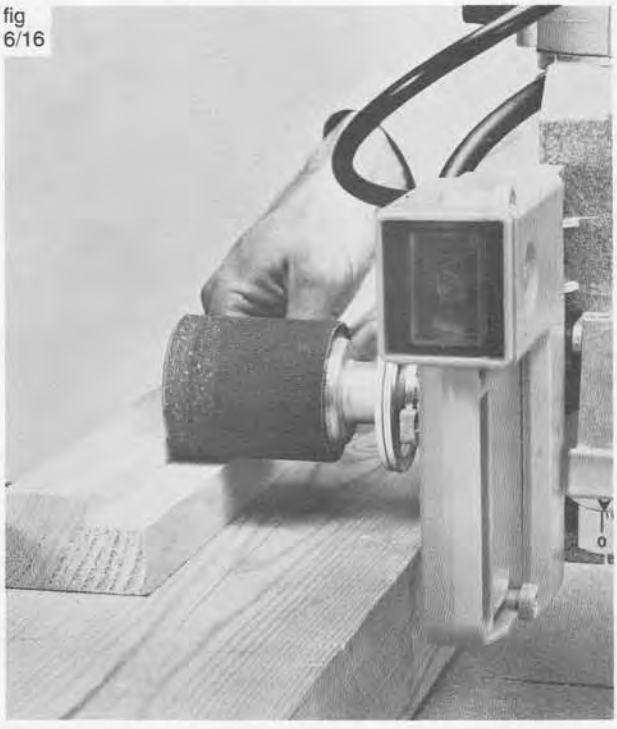


fig 6/16



Edge Sanding

Cut away the fence thus allowing the drum to be properly located (fig 6/17), or position two half fences in the table to permit the drum some forward and backward movement. Smoothing occurs as the wood is passed along the fence, with the drum protruding just in front of it (fig 6/18).

fig 6/17

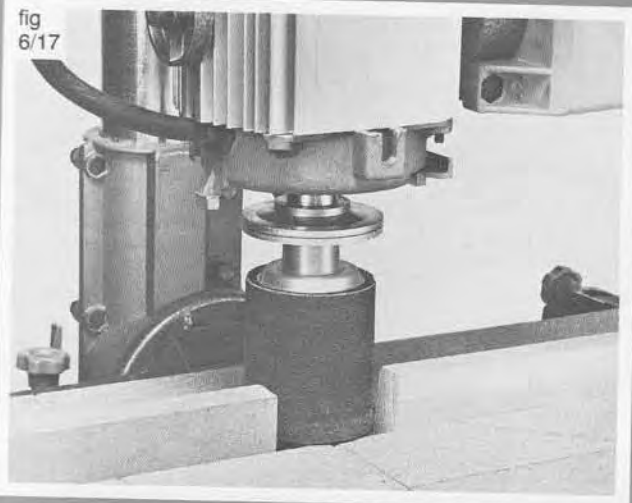
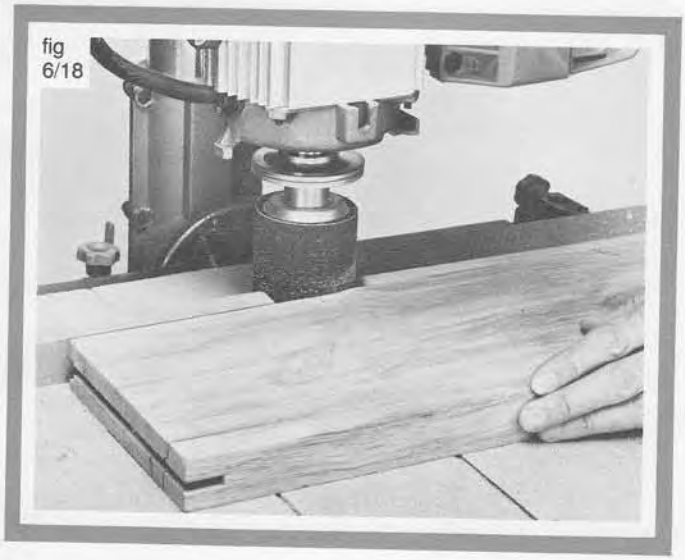


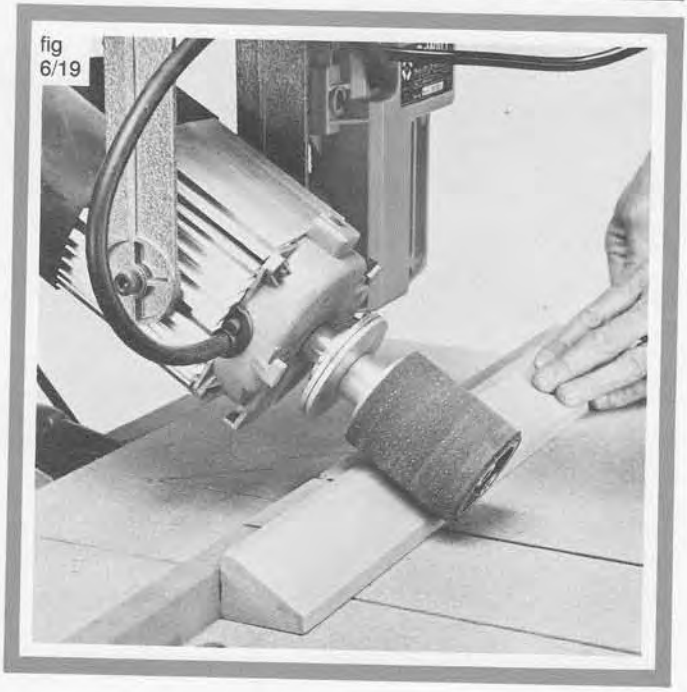
fig 6/18



Bevel Sanding

Angle the drum to correspond with the bevel on the wood. Lock the carriage on the arm so that the wood is abraded as it passes between the fence and drum (fig 6/19). The wood moves from left to right against the direction of rotation.

fig 6/19



Freehand Sanding

Because work is sometimes devoid of flat surfaces (e.g. cabriole legs), it cannot be held properly on the table. In these cases hold the work freehand against the underside of the drum (fig 6/20).

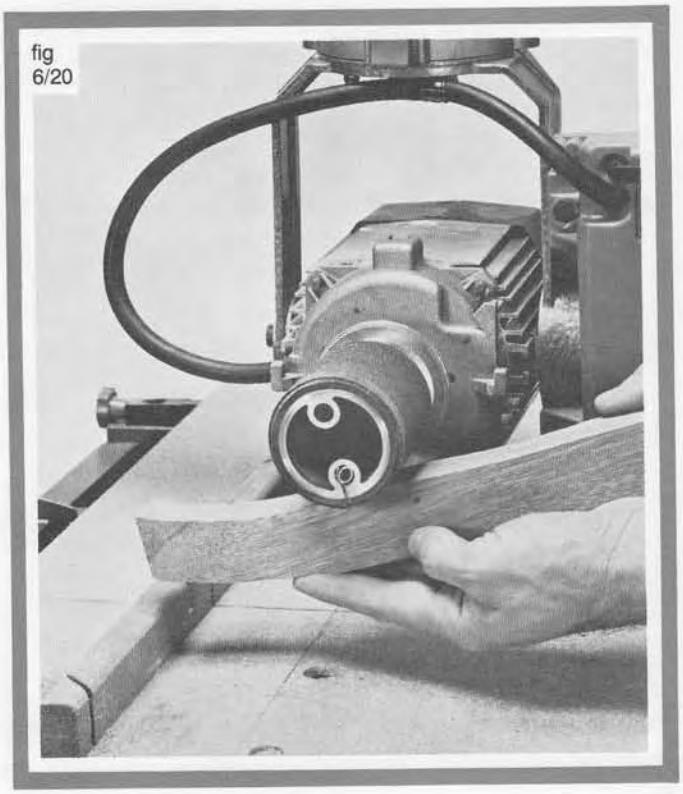


fig 6/20

Chapter 7

Router Attachment

CHAPTER 7

THE ROUTER ATTACHMENT

The high speed electric router is probably the most versatile of all portable power tools. Combined with the Powershop its range of operations is truly amazing. The Black and Decker DN66 Woodworker model is particularly recommended, but any router with a 43mm diameter collar can be used. Straight and curved work can both be tackled with equal ease.

Note: At the time of writing, the Router Mounting Bracket for the DW125 model will only accept routers with a motor housing diameter of 88mm, such as the Black and Decker HD1250 Industrial Model. The illustrations in this chapter feature specifically the DW320 with its own Mounting Bracket, but the principles and versatility described are equally valid to the DW125 and other models on which a router can be mounted.

Fig 7/1 shows some typical shapes made with a router mounted on the Powershop.

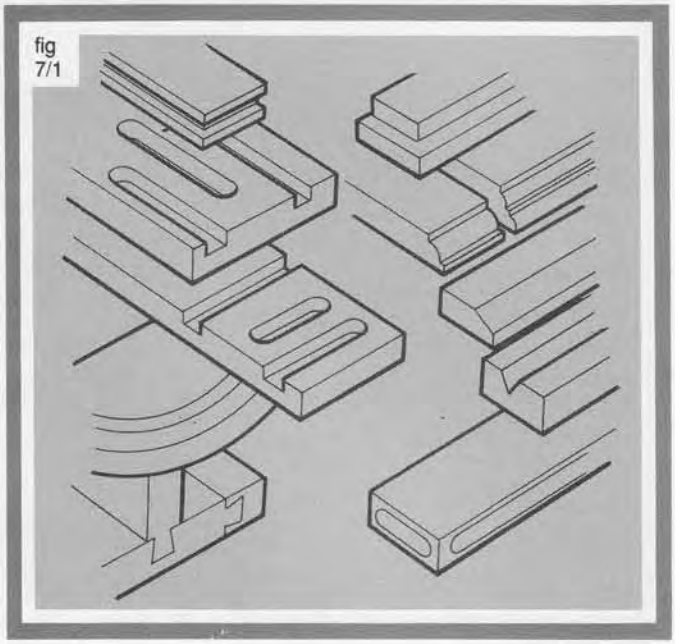


fig 7/1

Mounting

The Router Bracket (fig 7/2) is the main support for the router, which is mounted on the end of the motor casing (fig. 7/3) after removing all attachments from the left side of the motor. The control/plunge assembly unit must be removed from the router before mounting, so as to expose its collar (fig 7/4). The router is then secured as shown in fig 7/5 and fig 7/6.

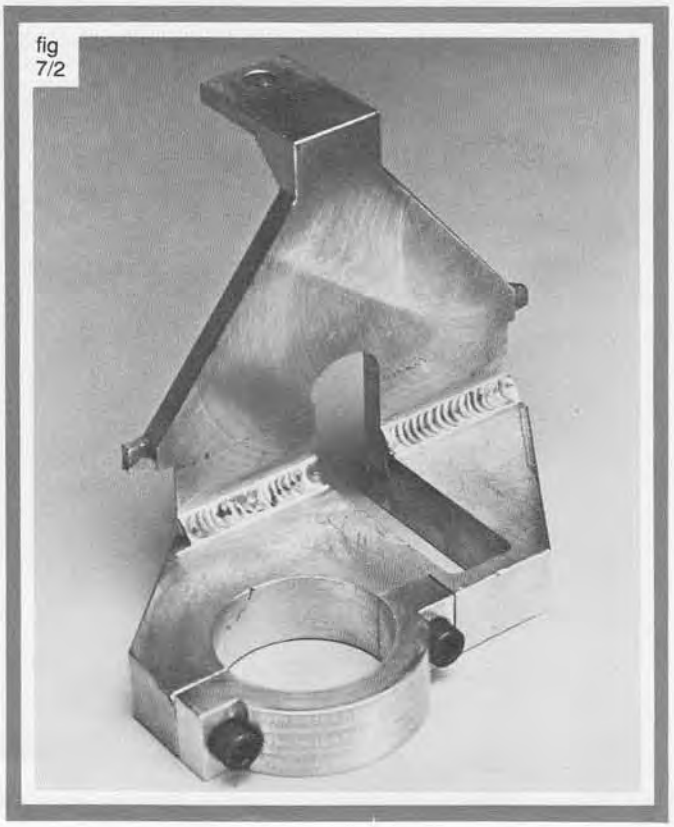


fig 7/2

fig 7/3

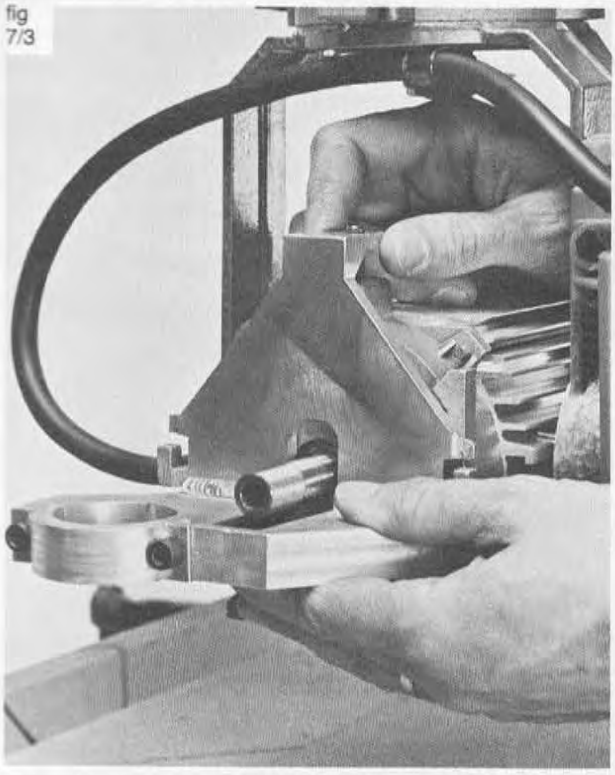
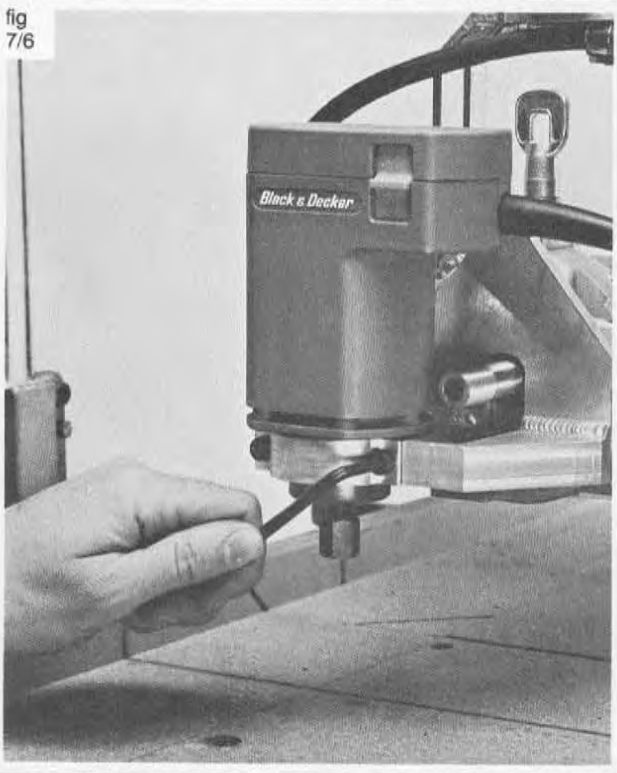


fig 7/5

fig 7/4

fig 7/6



Cutters

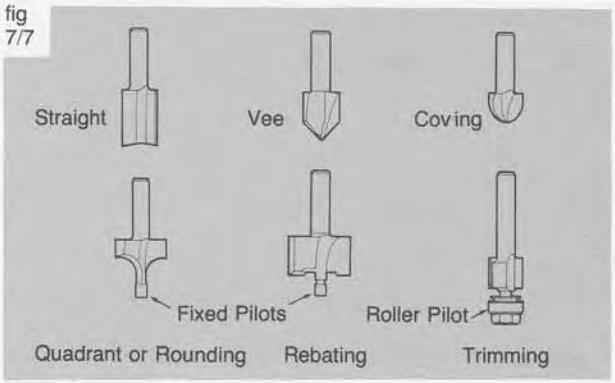
These fall into three main groups.(fig 7/7).

(a) Plain or pilotless where the wood moves past the cutter, or vice versa, though in the former case a fence must be used.

(b) Fixed pilots where the pilot controls the wood and the extent of the cut.

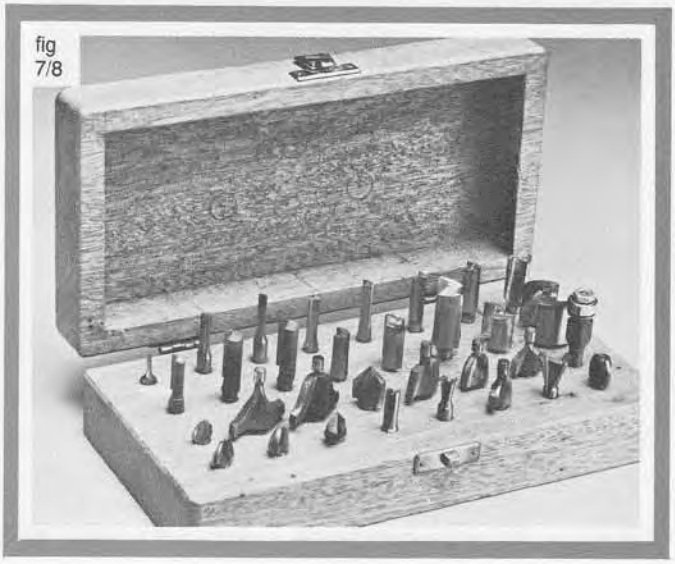
(c) Roller pilots which are small bearings. These cutters are more suitable for production work.

fig 7/7



At present the majority of cutters are made in high speed steel, though T.C.T. inserts are increasingly prevalent. T.C.T. cutters should be used with extremely abrasive manmade boards and hard, dense timbers. Store cutters in a block with holes in it, or better still a proper box (fig 7/8) for better protection.

fig 7/8



Trenching

Secure a straight cutter in the chuck. Its diameter should equal the trench width. Set all the machine locks except the carriage traverse, and set the exact position of the workpiece along the fence, by locating the cutter over the trench to be cut (fig 7/9). Cramp the wood to the table to prevent lateral movement, and set the cutter depth by letting it touch the wood and winding down the arm. Alternatively make shallow cuts until you reach the required depth. Pull the carriage steadily forward to cut the trench (fig 7/10).

fig 7/9

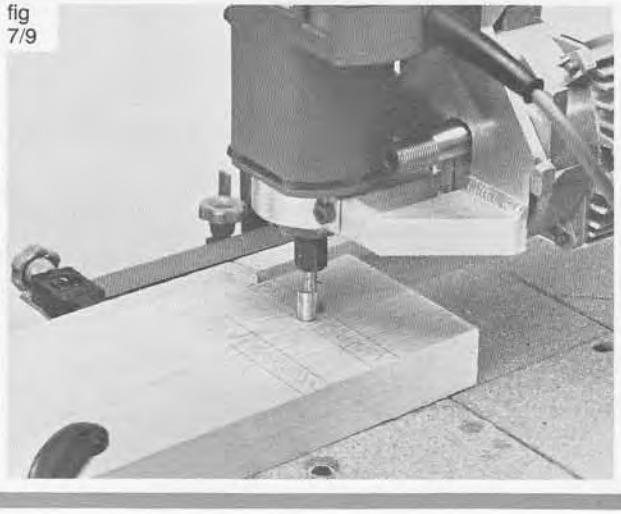
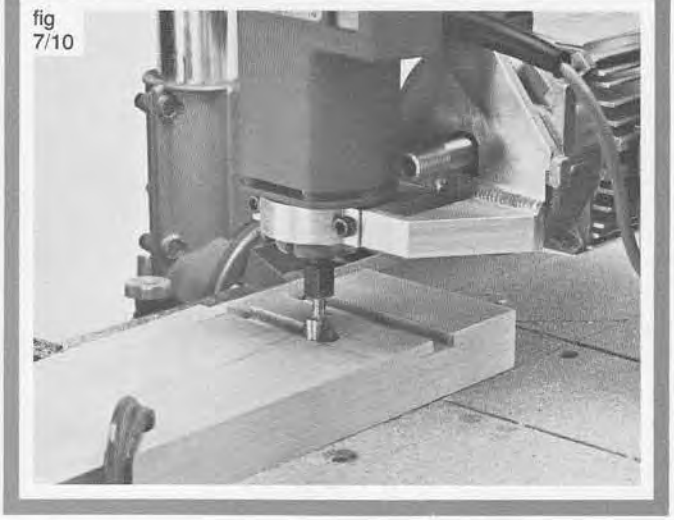


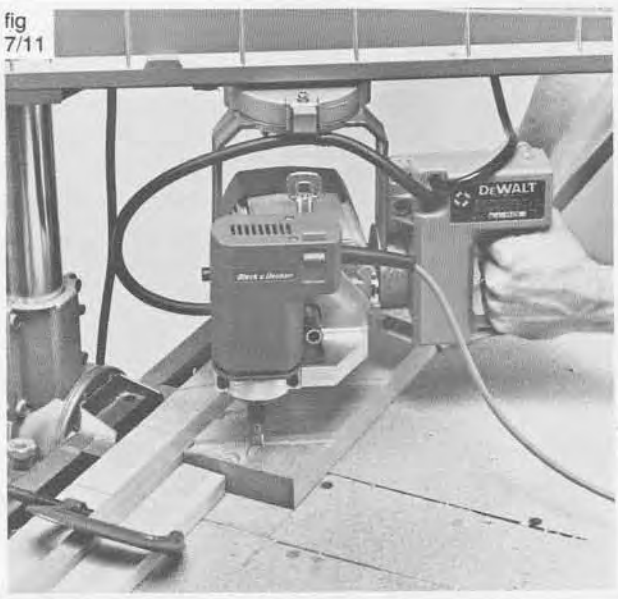
fig 7/10



The router is ideal for stopped trenches as little remains to be cut by hand after routing. A stop is only necessary when machining large quantities.

Angle trenching is basically the same as square trenching, with the arm swung left or right (fig 7/11). With a check made on scrap wood to verify that the angle on the scale is the one actually required on the wood.

fig 7/11



Rebating

Use a straight cutter of a size proportionate to the rebate, with the cutter protruding through the fence by the same amount as the required rebate width. Direction of feed as usual with the Powershop is against the direction of rotation. Rebates across the end of the wood should only be cut as above, where the wood is at least 125mm wide.

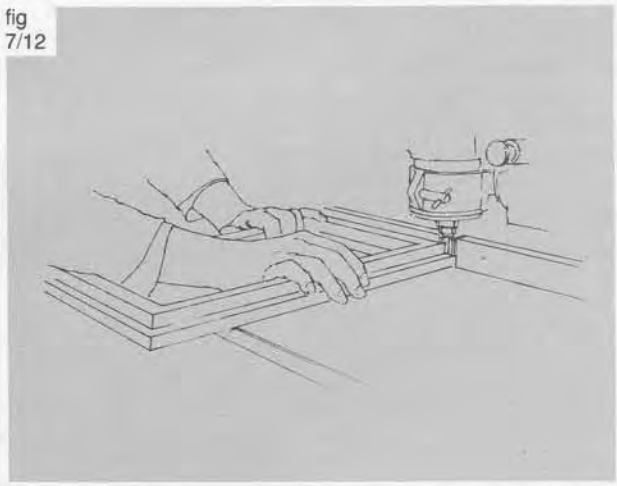
The ends of narrower pieces should be rebated as with trenching, by cramping the wood against the fence and moving the router.

Often, as with a window sash say, it is more convenient to rebate the outside of the frame after assembly. Make sure the joints are quite level before doing so. (fig 7/12).

Rebating cutters that incorporate pilots do not require a separate fence, and will therefore cut rebates in curved or straight edges.

Use a 'follower' (described later in template work) fixed to the table, to cut rebates with curved edges using standard straight cutters.

fig 7/12



Grooving

Using a straight cutter, feed the wood along the fence from the left (fig 7/13). If the groove is on a narrow edge employ a false raised fence to support it (fig 7/14). As with other attachments use the push stick nearing completion. For deep, wide grooves make two passes and hence lessen the work load on the cutter. Make even more passes if the cutter is narrow, otherwise a breakage may result.

fig 7/13

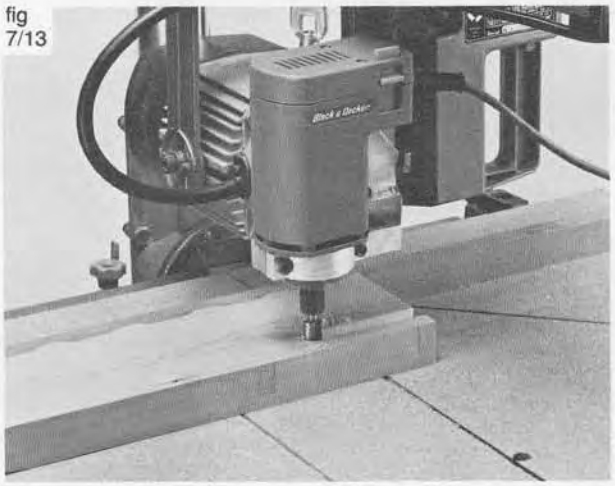
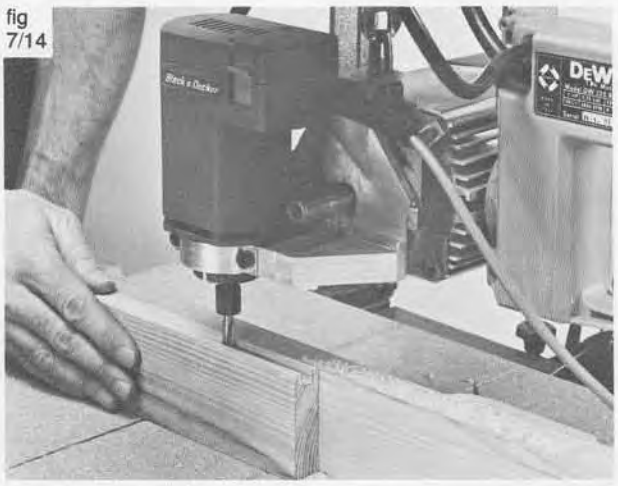


fig 7/14



Moulding

Moulding cutters possess pilots to cut around wood of all shapes. Set and lock the carriage along the arm, and feed the wood past the cutter maintaining contact with the pilot whether straight, convex or concave (figs 7/15 & 7/16). Adjust the height setting to produce different profiles from the same cutter. (fig 7/16a).

There is a quickly learnt knack to using cutters with plain pilots. Keep the work constantly on the move! Even stopping once can cause a slight indentation, or even slight scorching.

fig 7/15

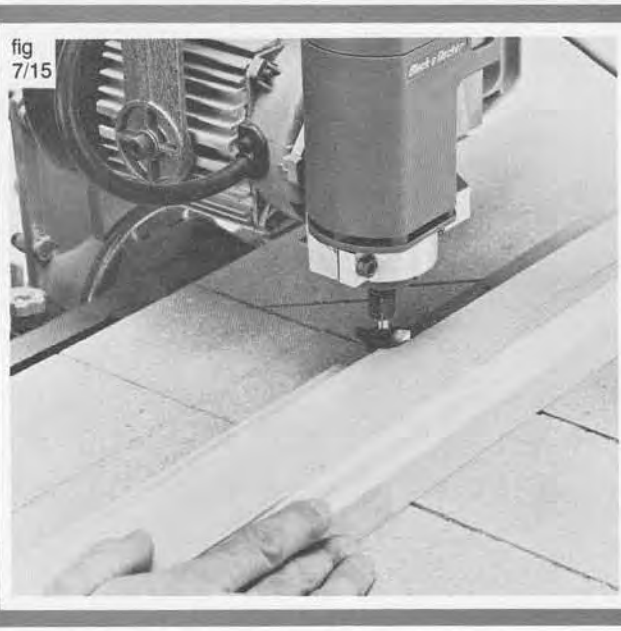


fig 7/16

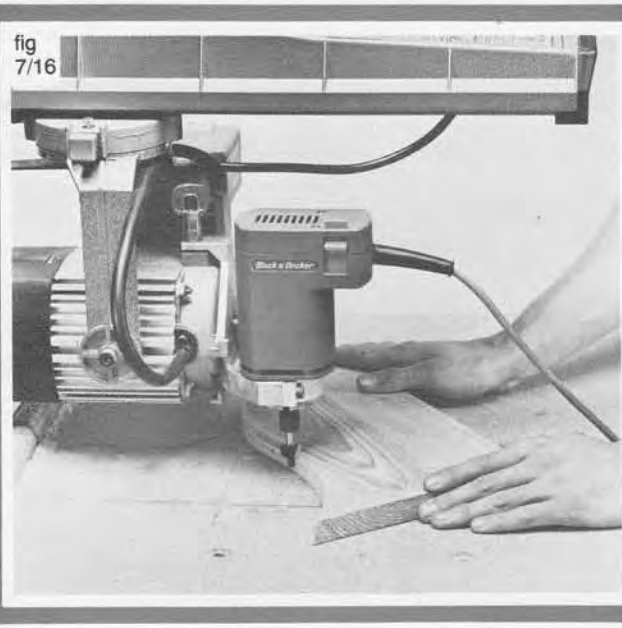
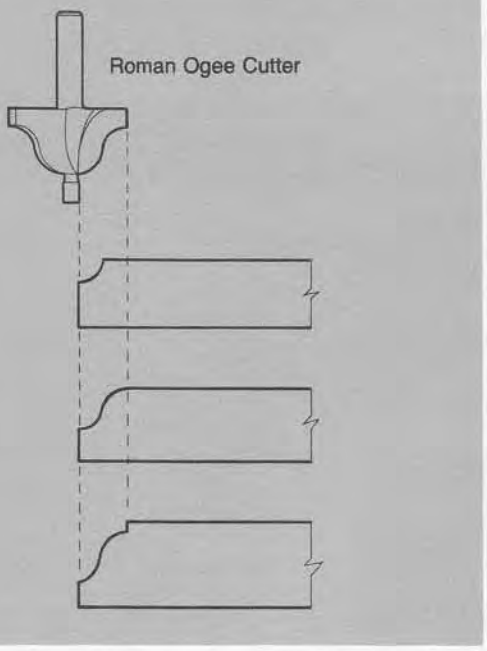
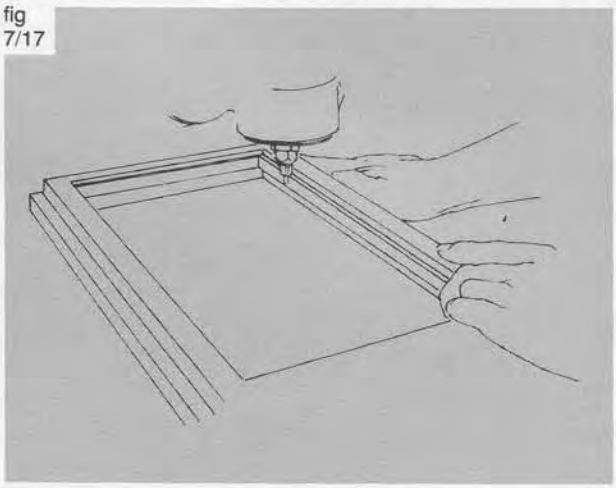


fig 7/16a



It is preferable to mould the inner edges of frames after assembly, thus simplifying the joint and creating a pleasant curve in the corners. (fig 7/17).

fig 7/17



Circular Work

The router can execute a variety of cuts on circular work using a false table and locating pin. Cramp this to the main table so that the distance from centre pin to cutter is half the required diameter. Using a straight cutter, revolve the work anti-clockwise on the pin (fig 7/18). Use this same table when cutting the face of the disc (fig 7/19). With the machine running, lower the arm into the work to make the initial boring cut.

Use a cutter with pilot to mould the edges of discs (fig 7/20).

fig 7/18

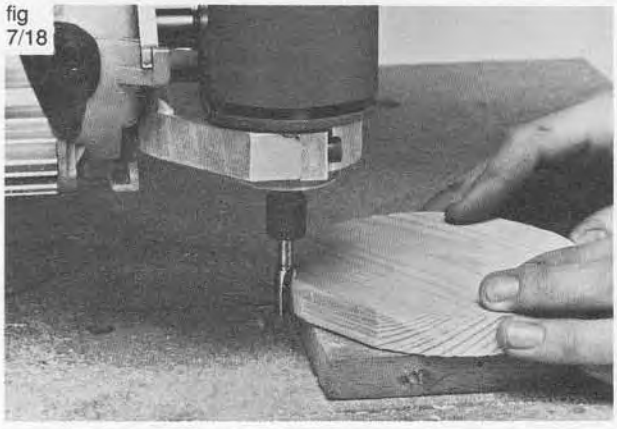


fig 7/19

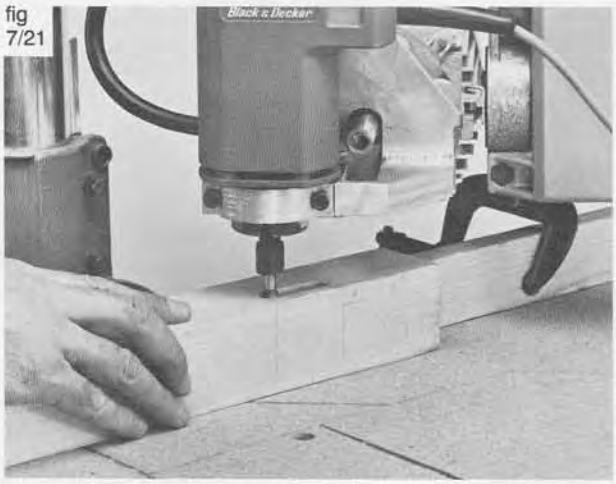
fig 7/20

Cutting Mortises

To cut mortises of any length on faces or edges, use the width of a standard straight cutter for marking out the width of the mortise. Position the cutter directly over the joint to be cut, aligning the wood so that the mortise end is in line with the cutter. Then turn the column handle a couple of times to cut down about 6mm. Move the wood along the fence to the opposite end of the mortise, and then back to the starting point. (Fig 7/21). Repeat the 6mm deep cuts until reaching the desired depth.

Cut when the wood is moving from left to right, using a stop to limit the amount of reverse. It is customary after routing to square off the mortise ends by chisel, rather than round over corresponding tenon edges.

fig 7/21



Template Work

Your Router Attachment can work to virtually any outline. First make a template to the exact shape required out of plywood 6-9mm thick (fig 7/22). Then use the template to mark out the work, and remove waste to within 1mm of the line using either the sabre saw attachment, a jigsaw or a bandsaw. Screw the template to the wood in positions such as those to be taken up by grooves or joints, where the hole is of no consequence. Pin a plywood follower (150mm x 25mm) to the table, having first reduced one end in width and round over (fig 7/23). Obviously this will need to be thinner than the template. Position so that the cutter is exactly level with the rounded end of the follower, and just clear of its upper surface. Use any cutter between

fig 7/22

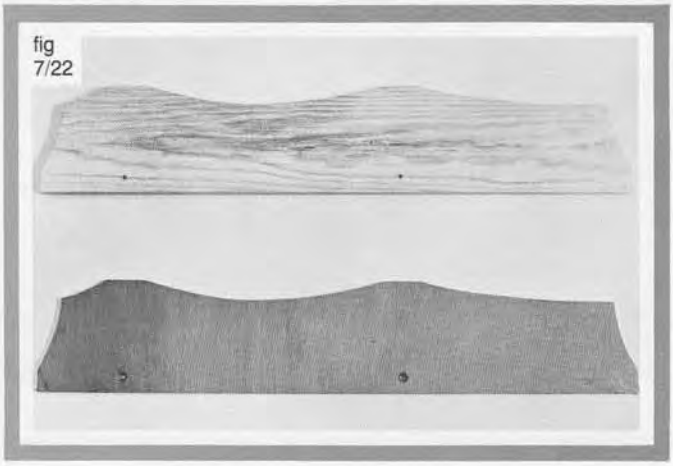
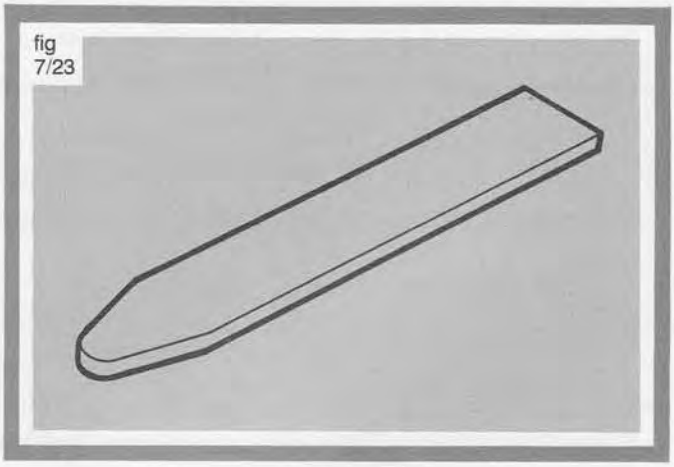


fig 7/23

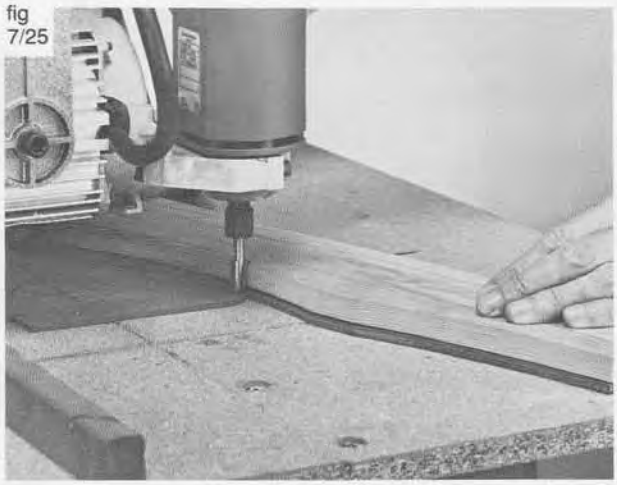


6mm and 12mm in diameter. The end-grain parts are best tackled first (fig 7/24). Present the wood to the cutter so that the template is in contact with the follower, where it must remain throughout the operation (fig 7/25).

Remember – When a workpiece has to be shaped, it is far better to form trenches, rebates, grooves or make any other cuts before shaping takes place. It is much easier to machine these cuts while the wood still has parallel edges.

fig 7/24

fig 7/25

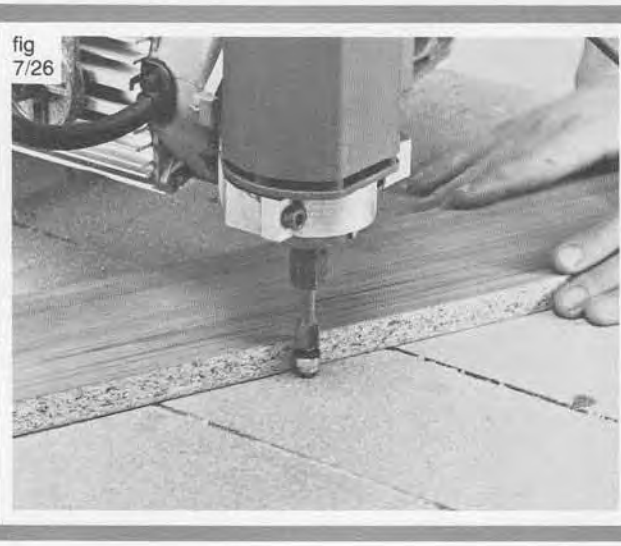


Plastic Laminate Trimming

A router equipped with T.C.T. cutters is the ideal trimmer for extremely tough and hard plastic laminates of the Formica type. Where plastic is bonded to the face of a board, a special edge-trimming cutter with a roller bearing pilot is available to level off edges. The board bears against the roller, whilst the cutting edges remove excess plastic producing a flush edge. The only setting or adjustment needed is to ensure the router is at the correct height, with all Powershop clamps in operation (fig 7/26).

When plastic is bonded to both the face and edge of a board, it is usual to form a small chamfer at the corner where they meet. In this case the tipped cutter does not have a pilot, so employ the follower described earlier. The size of the chamfer cut is determined by the cutter position in relation to the end of the follower.

fig 7/26



Recessing

Rectangular recesses can be formed by using a plain cutter and a home made jig, which consists of four fences secured to a false table, itself fixed to the main table of the Powershop. Space the fences according to the wood size, recess size required, and the cutter diameter. (Fig 7/27).

With the router in a fixed position and the jig secured, lower the cutter to penetrate the wood by about 6mm. Move the wood around the four fences to form a rectangular groove at the edge of the recess (fig 7/28). Dispose of the waste in the central recess by moving the wood freehand. Continue to cut by lowering the arm 6mm in stages until the desired depth is reached. Clear any chippings from the jig to allow free movement of the wood (fig 7/29) so that the recess can be completed.

fig 7/27

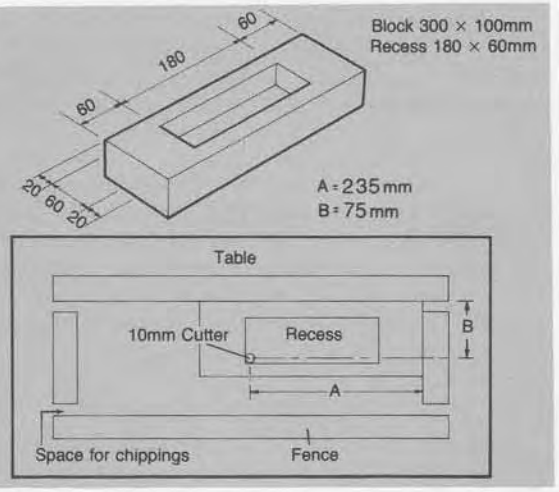


fig 7/28

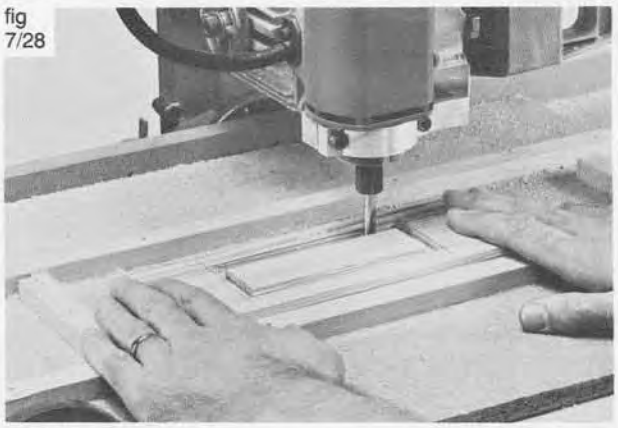


fig 7/29

Novelty Cuts

For freehand writing or even drawing use a vee or small straight cutter, first making the outline to be cut in pencil. Position the wood beneath the stationary router. Practice makes perfect (fig 7/30), though an assistant operating the column handle if the depth of cut has to be increased frees two hands to remain on the wood.

fig 7/30

A pierced grill effect is produced by cutting a series of trenches just over halfway into one side of the wood, and then grooving to the same depth on the opposite side (fig 7/31). This piece, which is suitable for panels or other decorative features, can also be created using a dado head instead of the router.

A further cut used in panel decoration consists of a series of vee incisions running parallel to and across the grain, or cut at 45° to the edges (fig 7/32). If you wish, you could also use a small coving or straight cutter instead of the vee cutter. Small semi-spherical indentations can be made with a coving cutter.

Position the cutter over the centre of the indentation, by the setting of fence and router. Create the depressions by lowering the arm.

Router cuts do not have to be continuous. Stopping and starting at various points on a moulded edge for instance can make it doubly attractive, even using a simple cutter like a quadrant. However great accuracy is called for in marking out and then following all lines (fig 7/33).

Once a wide piece of wood has been surface routed, it can always be cut into narrow strips to produce slim mouldings as in fig 7/34.

fig 7/32

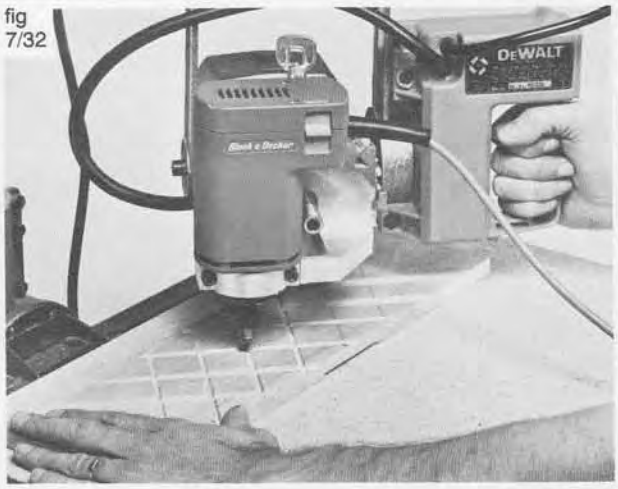


fig 7/33

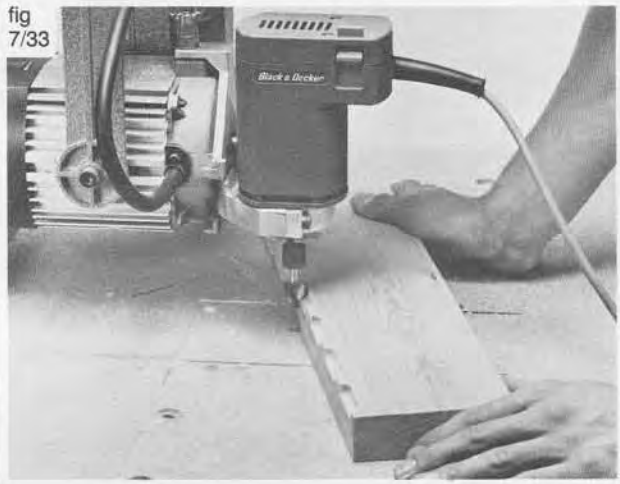


fig 7/31

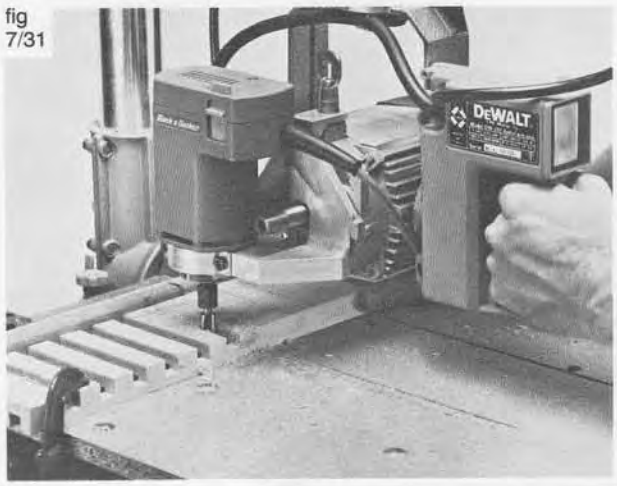
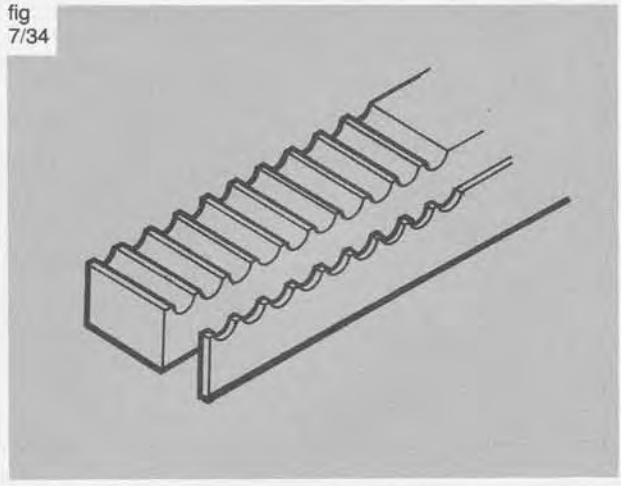


fig 7/34



With a straight bit mounted the router can even be used for, what is effectively, drilling a series of holes with great accuracy (fig 7/35). To do this the router is held in a fixed position relative to the fence and the timber is moved so that the cutter locates directly over the point where the hole is required. With the router switched on, the arm is then slowly lowered via the Powershop elevating handle until the necessary depth of hole has been achieved.

NB. Because the Router Bracket has a yoke diameter of 43mm, it will accept any portable power tool with the same diameter, including electric drills (Fig 7/36 & 7/37). A feature which increases Powershop versatility even further.

fig 7/35

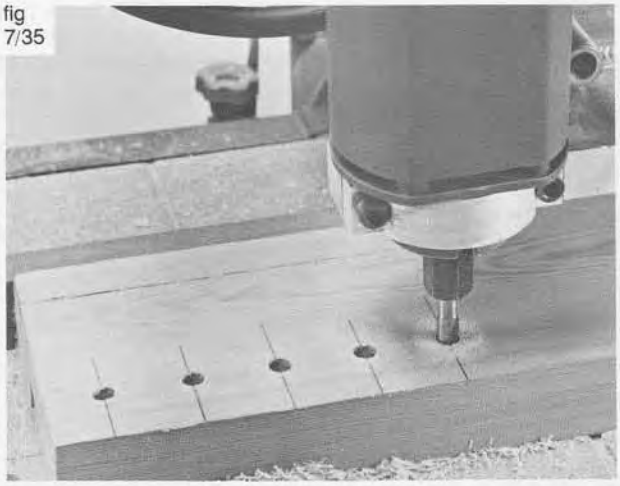


fig 7/36

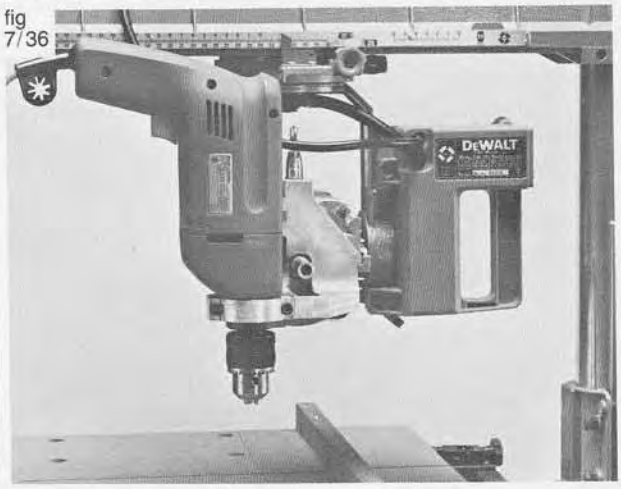
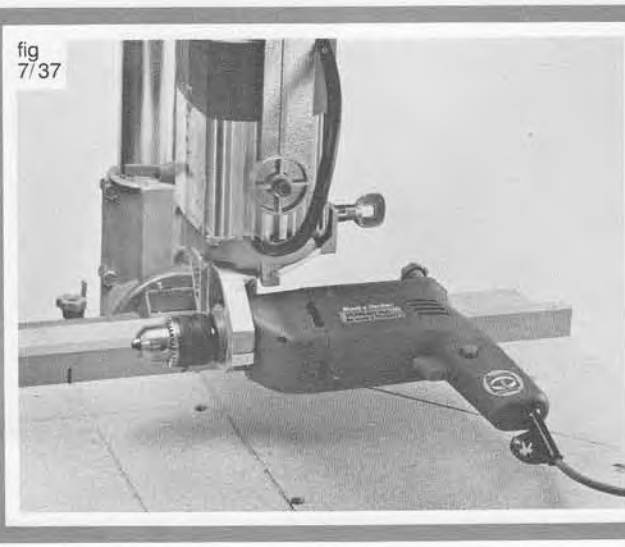


fig 7/37



Chapter 8

Sabre Saw Attachment

CHAPTER 8

THE SABRE SAW ATTACHMENT

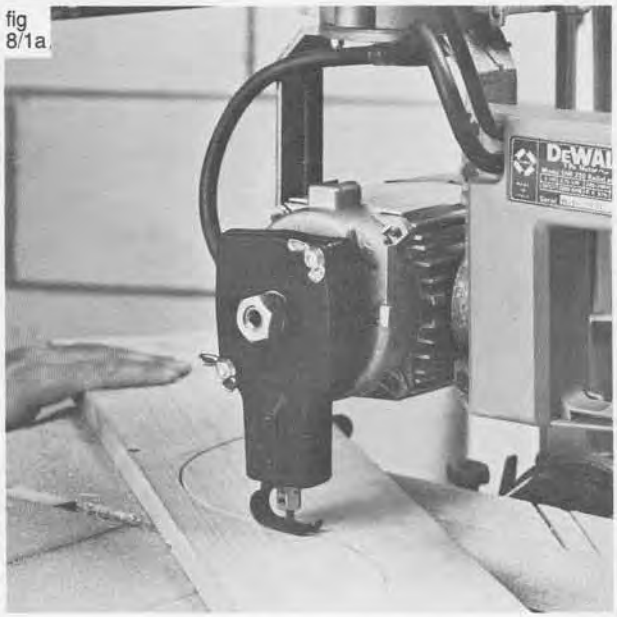
Although we have described the simple cutting of discs using the standard circular saw blade, the cutting of curved work is really the province of the Sabre Saw attachment (fig 8/1a).

The DeWalt Powershop with its Sabre Saw attachment is superior even to a bandsaw as it will readily tackle completely internal cuts, and is especially suitable for thinner materials such as ply and other man-made boards.

The attachment is equipped with a medium teeth blade of long-life steel, suitable for a wide range of materials.

You will note that the teeth on the blades point away from the attachment, which is the opposite way to teeth on hand-held portable jig saws. On no account fit blades other than the correct purpose-made ones.

fig 8/1a



MOUNTING AND POSITIONING THE SABRE SAW

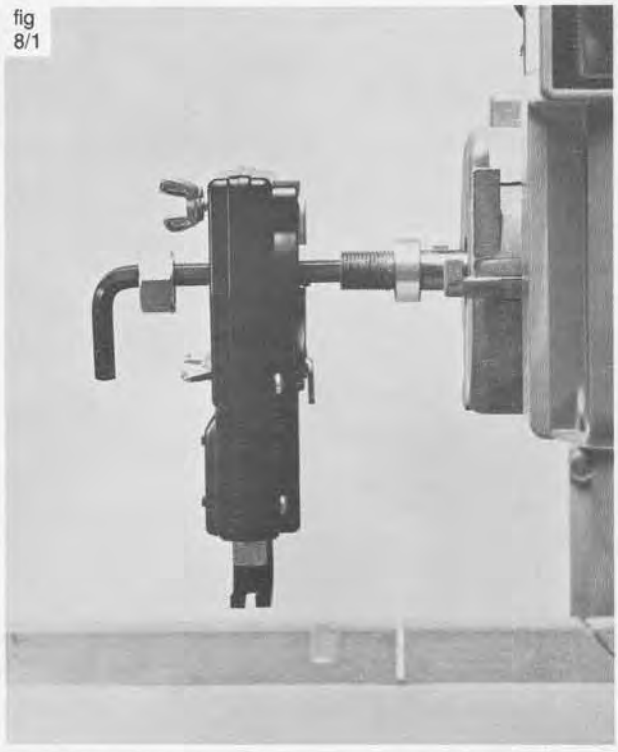
First remove the guard and all other items attached to the motor spindle. Then slide the special arbor spacer onto the spindle (fig 8/1) folowed by the attachment itself.

To anchor the unit in position, locate the two hooks on the end of the fixing screws in the special lugs on the end of the motor housing. The arbor lock nut then secures the mechanism to the spindle, which needs only moderate tightening.

Raise the arm for sufficient clearance when fitting the blade.

Normally the rear part of the table is used when sabre-sawing after having removed the fence.

fig 8/1



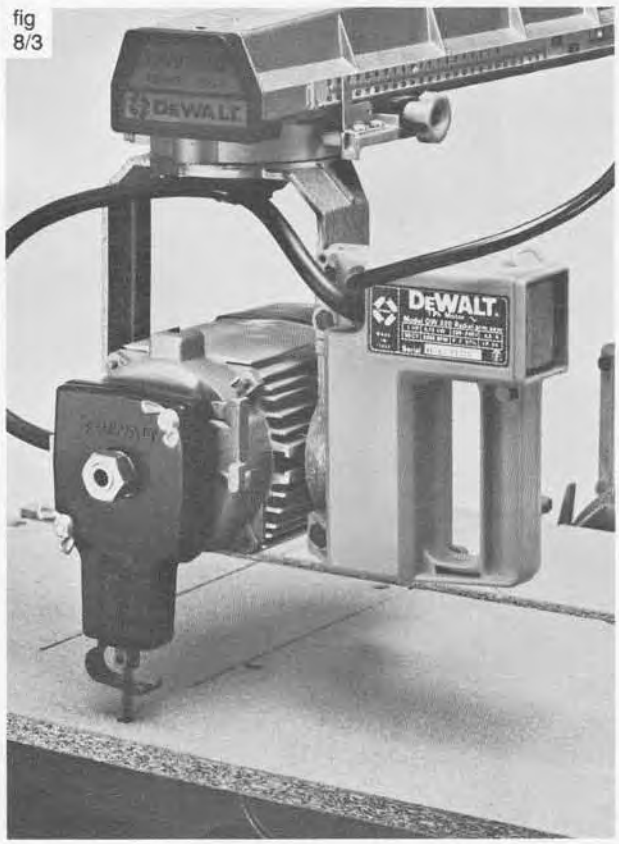
On the DW125 model, a piece is already cut from the edge of one of the movable table sections so that the attachment blade can penetrate into the aperture. On the DW320 model it is necessary to make a suitable hole in the table section yourself, or to insert distance pieces in place of the fence to provide a gap in the table (fig 8/2).

To use the saw in this position, rotate the motor to the in-rip setting and lock carriage to arm so the blade is directly over the gap in the table. Lower the arm till the shoe at the base of the attachment is just in contact with the surface of the wood to be cut. The shoe prevents the work piece rising due to the reciprocating blade action.

fig 8/2

If it is more convenient to saw in a different position, then bore a hole elsewhere in the table to accommodate the blade. (fig 8/3). This will need to be 10mm in diameter, except for bevel cutting when the hole should be 20mm.

fig 8/3



Method of Working

When cutting curves, the sawing is made 1mm or so from the line on the waste side to allow for final smoothing.

Since the cutting is freehand there may be slight irregularities as with a portable jigsaw or stationary bandsaw. Thus curved cuts require extra attention to finalise shaping right down to the line.

Do not hurry your sabre saw but allow it to cut at its own speed. Even with the shoe set, hold the work firmly to the table during cutting.

Small Curves

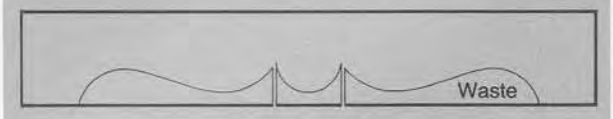
The ability of the sabre saw attachment to cut curves of small radii is necessarily limited by its capacity to negotiate within its own kerf. However there is a dodge available to make these cuts.

Make a series of cuts from the edge of the wood to within a millimetre or so of the line (fig 8/4). If the saw then follows the line the waste is removed bit by bit, giving the blade more space to negotiate the curve. This sort of straight cut from the edge of the wood, may be employed whenever continuous cutting along the outline is virtually impossible as in fig 8/5. The straight cuts near the centre are essential before cutting the profile is attempted.

fig 8/4

Preliminary cuts

fig 8/5

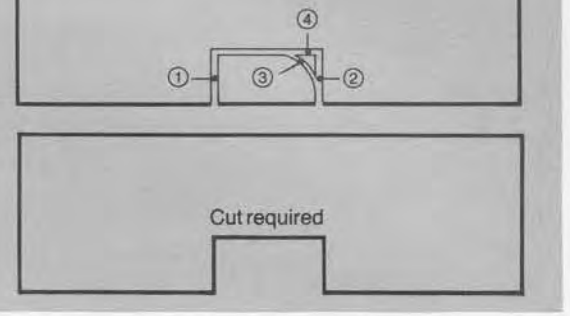


Preliminary cuts

Square Edge Cuts

Often the sabre saw is the only means available to make straight cuts easily. Fig 8/6 depicts a situation where the sabre saw completes a cut-out in stages at the edge of a piece of wood. Where the waste width is so narrow that the blade cannot turn, make a series of straight cuts from the edge so that the waste is removed as sawdust.

fig 8/6



Internal Cuts

For all such cuts, first bore a hole in the waste so the blade initially penetrates the wood (fig 8/7). The circle is the easier of the two to cut, as sawing is continuous throughout (fig 8/8). However, where the centre cut-out has straight sides, the corners can only be cut by sawing into them. Remove the bulk of the waste from the centre, and then tackle each corner as for Square Edge Cuts (fig 8/9).

fig 8/7

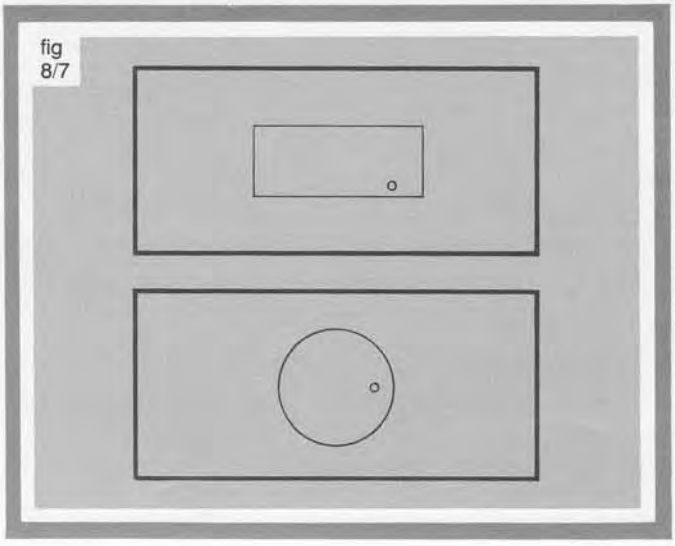


fig 8/8

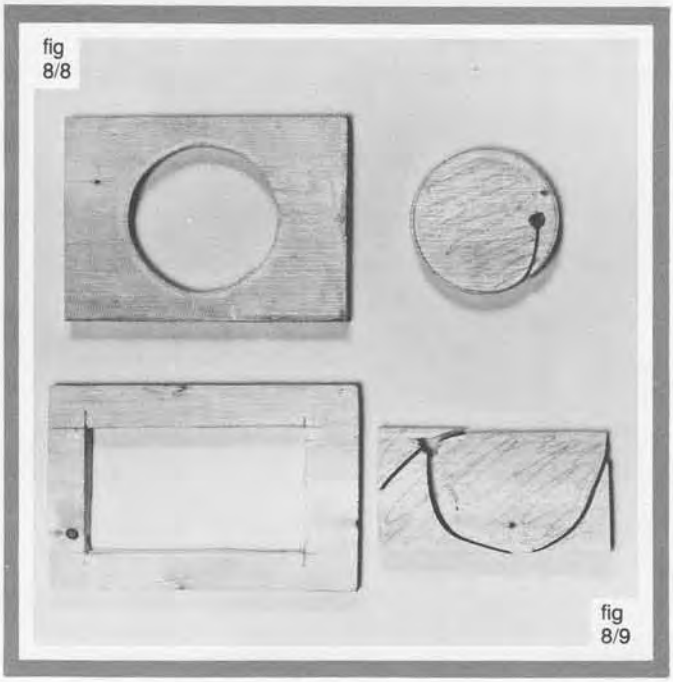
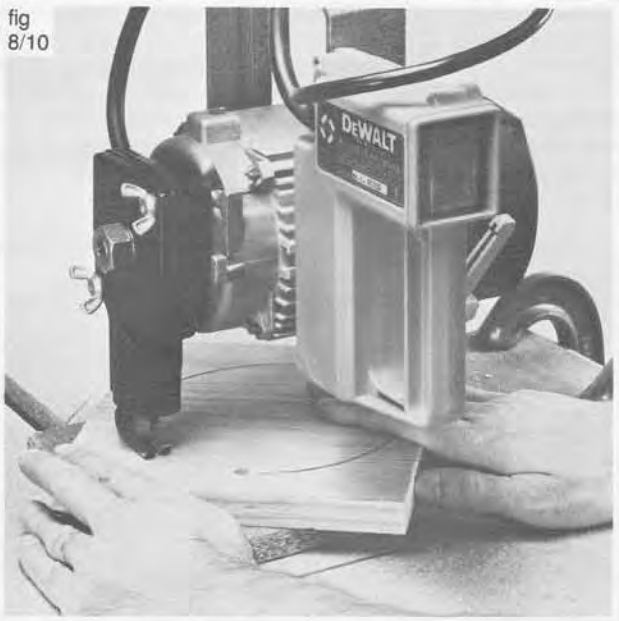


fig 8/9

Bevel Cutting

Tilt the motor to the desired angle using the scale, and if the blade was previously vertical in the hole move the carriage along the arm a little to give clearance to the blade at this new angle (fig 8/10). Lock the carriage and motor clamp handle, and carefully set the shoe. Actual sawing is identical to vertical cutting, though a little extra waste is required because of the bevelled edge created.

fig 8/10



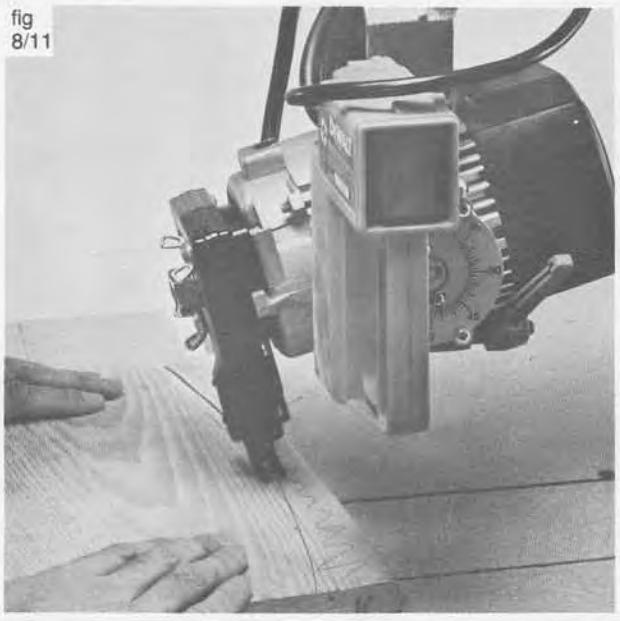
Circle Cutting

The sabre saw is particularly adept at cutting circles, whether singly or in batches. Mark out using a compass and saw some little way from the line. A jig is useful when cutting several circular pieces.

Construct the jig as explained for cutting circles with the circular saw blade, with a screw partly inserted into the plywood and the head sawn off. Bore a hole to allow passage of the blade, with the distance from pin to hole made equal to half the diameter of the circular pieces required. The underside of these must have a hole bored, to centrally engage with the pin, with its position from the edge again equalling the required radius (fig 8/11). This allows cutting to commence at the edge.

With careful setting up any number of pieces can be cut to size without marking out. Cramp the jig to the table so the pin is exactly in line with the blade, ensuring that cutting is always tangential to the circle.

fig 8/11



Chapter 9

Drilling Attachment

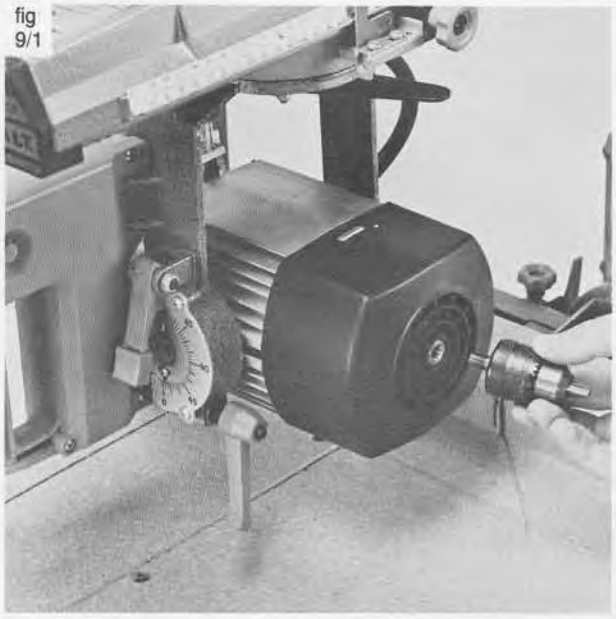
CHAPTER 9

THE DRILLING ATTACHMENT

The drilling facilities offered by the Powershop far exceed the range of applications available using an ordinary portable power drill. High accuracy drilling can be carried out both at right angles and at acute angles to the work, and using the Powershop for this purpose is particularly suited to repetition tasks.

Fitting the chuck attachment to the Powershop is simplicity itself. The 10mm chuck of standard three jaw pattern is secured directly to the motor shaft, which has an internal thread at the right hand end into which the chuck is screwed (fig 9/1). Tighten the chuck by hand, using an Allen key at the opposite end of the shaft to prevent rotation whilst mounting. Remove the chuck in the same way that you would from a portable electric drill. Remember that the thread is right handed at this end of the motor, so the chuck unscrews anti-clockwise.

fig 9/1



Safety

Note: Always remove the sawblade and associated flanges from the Powershop and resecure the sawblade guard in position to cover the exposed motor shaft, before switching on to drill with the machine.

Bits

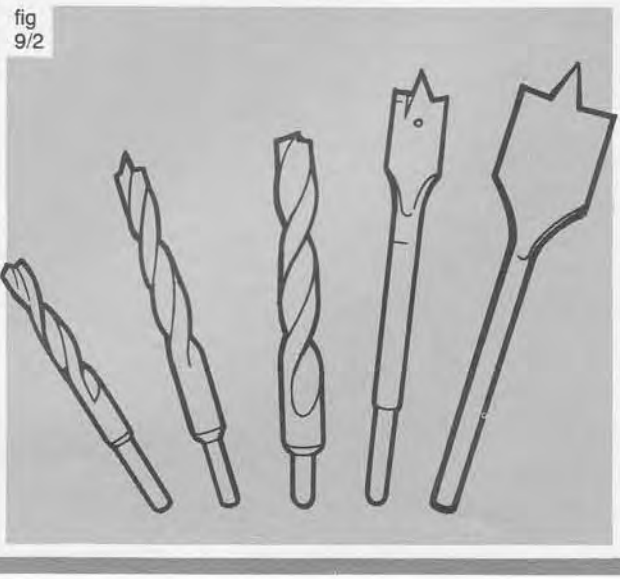
Special wood boring flat bits, plus lip and spur bits are ideal for Powershop drilling (fig 9/2). The points on these bits enable accurate centring on the workpiece, though engineers' morse pattern twist drills can also be used. These are available in a wide variety of sizes.

The 10mm chuck capacity determines the maximum size of morse drill that can be used. However because of the lack of a definite point to these drills, use a bradawl to locate where the hole is to be made. Never use a screw point bit with the Powershop, as that method of boring cannot be adequately controlled.

One advantage of flat bits is their ability to bore nonstandard size holes when their edges have been filed. To bore holes which taper in diameter, simply file the bit edges so they possess a taper corresponding to the required hole dimensions.

It is best to file down by half the particularly long points on new bits, which are intended for free hand portable use. Thus holes can be made well into the wood, without the risk of penetrating the opposite surface.

fig 9/2



Straight Boring

Since the bit cannot be brought down close to the table surface (due to the chuck's central position on the motor) the work will often have to be raised using a false table or packing piece (fig 9/3). To bore this way, swing the motor so the bit points to the column, tightening all clamps except the carriage lock.

Actual boring just consists of moving the carriage steadily along the arm, though a stop placed between fence and motor assists the making of holes to pre-determined depth. If a hole is to be made straight through a piece of wood, bore from both sides to eliminate splintering on the exit side. For this, fix a depth stop to the table so the bit tip just penetrates the rear surface and the exact point to complete the boring can be instantly located on the other side.

A higher fence is needed for wider pieces of wood where holes must be made well away from the edge. The fence must always provide support directly behind where the hole is being made (fig 9/4), otherwise instability will ensue. Cramp the work in place for large or deep holes (fig 9/5), so the bit can be withdrawn every 25mm or so to clear chippings and also to free both hands to move and control the carriage.

fig 9/3

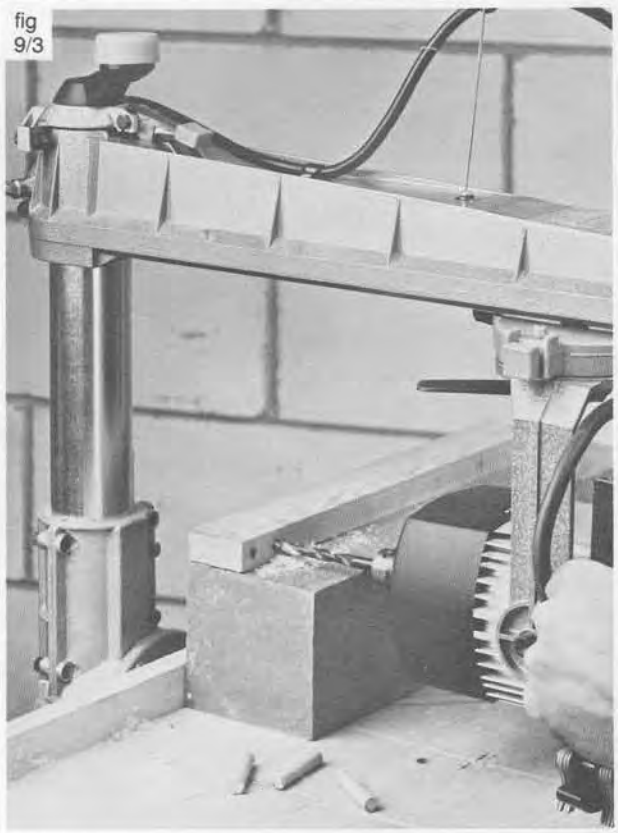


fig 9/4

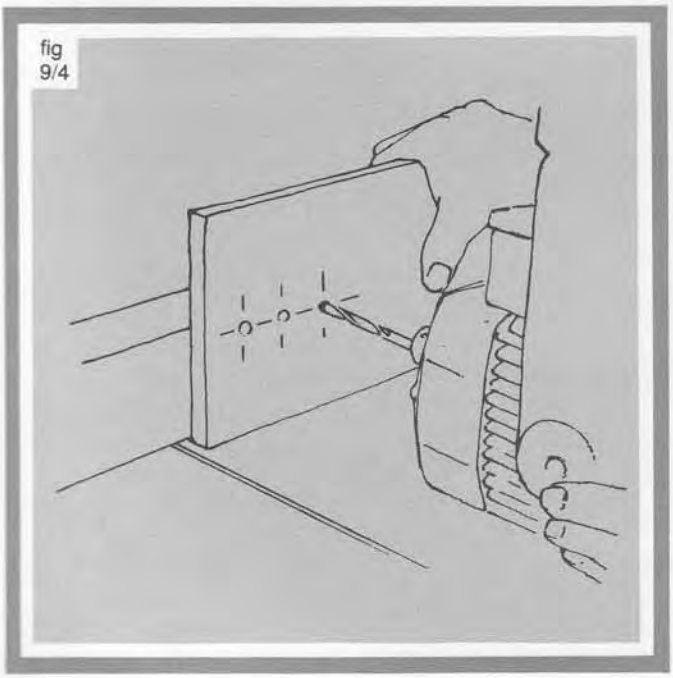
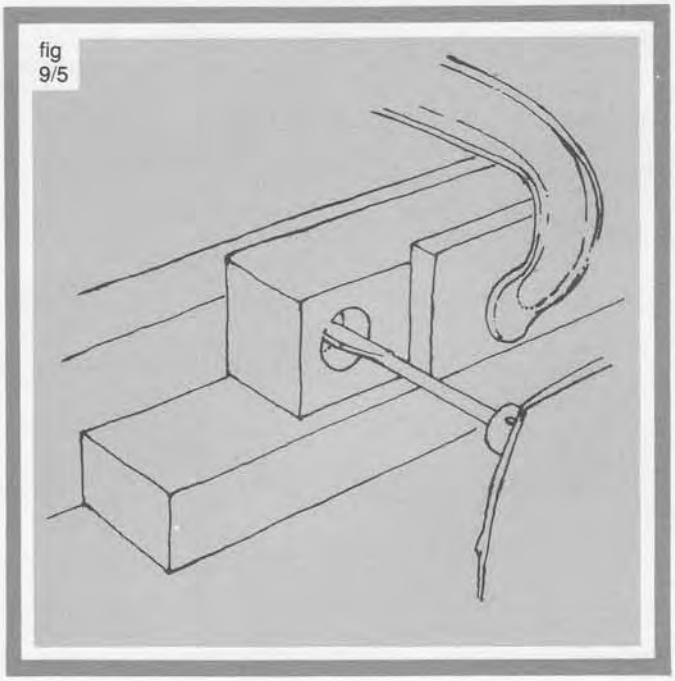


fig 9/5



Mortising

The ability to drill repeated holes with extreme accuracy enables the Powershop to be used to make mortises (also possible with the router attachment as described earlier). Using a specially prepared table/fence arrangement to suit the dimensions of the material involved, a series of overlapping holes (fig 9/5a) can be drilled on a common centre line to remove the bulk of the waste. The remaining material is then cleaned out with a hand chisel.

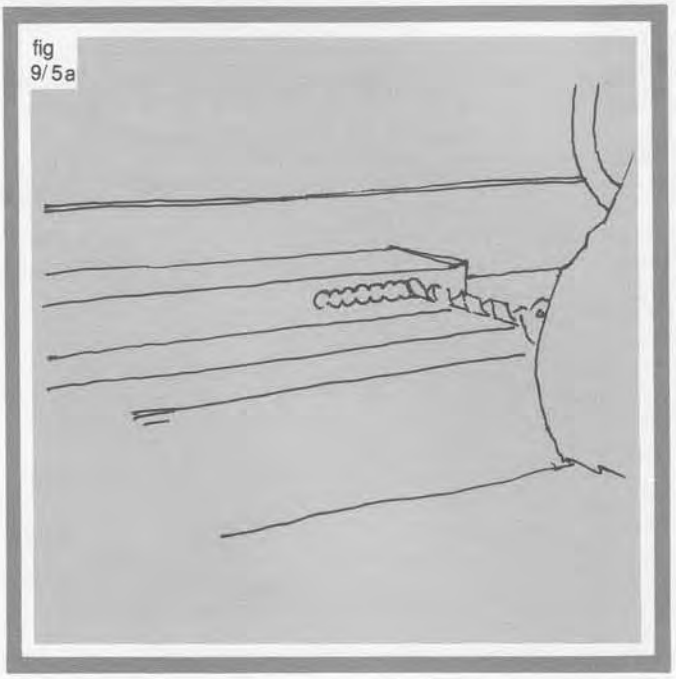


fig 9/5a

End Boring

A raised table and false fence are again required for the end grain boring frequently involved in dowel joints. Here the wood moves, not the carriage. Feed the work onto the bit keeping it tight to fence and table (fig 9/6). The hole depth, though rarely critical can be simply controlled by pencil marking indicating the limit of the wood's forward movement. By swinging the arm to the left, and rotating the carriage to the right more space is made on the right side of the table where boring occurs. Be sure to lock the motor axis exactly parallel with the fence.

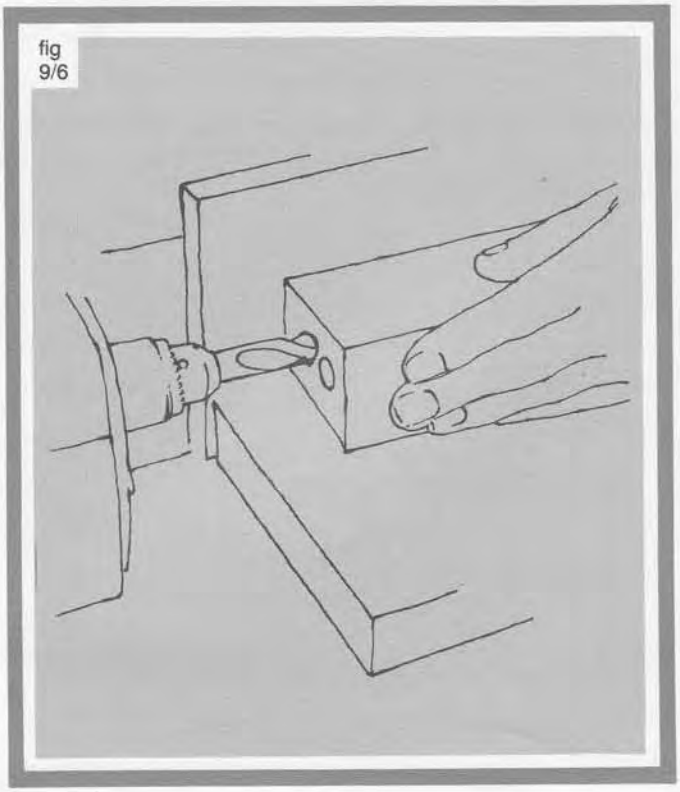


fig 9/6

Angle Boring

There are various methods of angle boring, which is often used to strengthen a mitre joint with dowelling. In the first method, swing the arm 45° for a true mitre, so the drill bit is at 90° to the surface to be bored. Usually a false table and fence will be needed, as will a cramp to prevent the wood being dislodged instead of bored. Then just push the carriage backwards to bore the hole (fig 9/7).

In the second way, remove the existing fence and position arm and carriage for straight boring. Cramp a temporary fence across the table at such an angle that the end to be bored is at right angles to the bit. With false table and cramp in place, make the hole by moving the carriage along the arm (fig 9/8).

The last mode of angle boring utilises the right hand part of the optional Special Mitre Fences. Prepare this as for taper-ripping, fitting it with a suitably high front fence to which a false table can be pinned. Then cramp the workpiece in place and angle the arm of the mitre fence as required. Having set the bit parallel to the main table fence, feed the wood to the bit, keeping the rear arm of the mitre fence in close contact with the main fence (fig 9/9).

fig 9/7

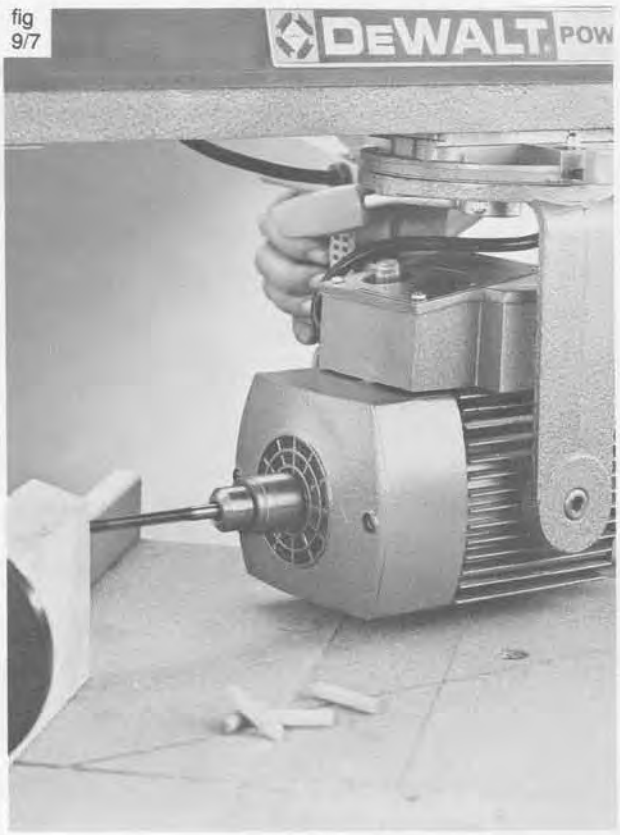


fig 9/8

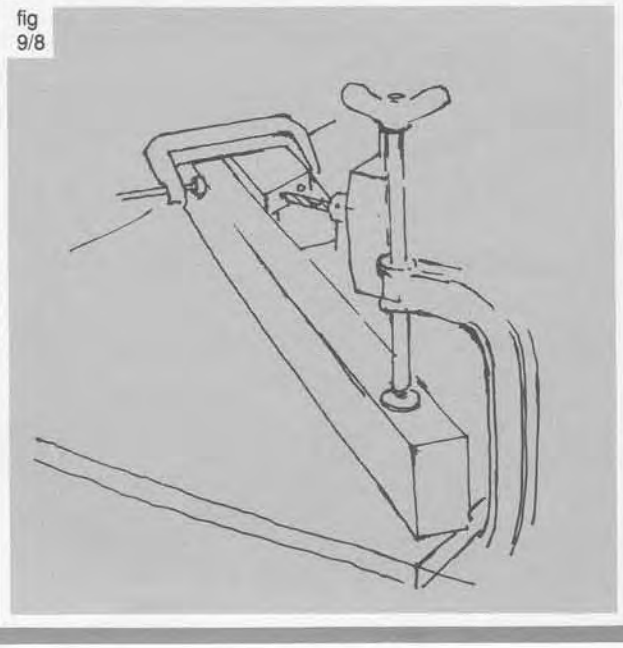
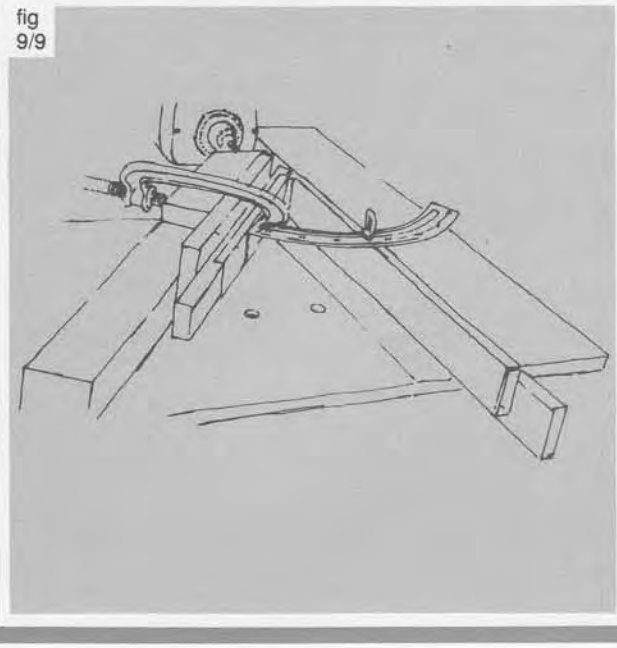


fig 9/9



Boring Round Material

Cylindrical material such as dowelling can be drilled on the Powershop, provided a simple jig is used as in fig 9/10. For maximum accuracy mark the prospective centre of the hole with a bradawl. This will prevent even a pointed bit from skidding on the curved surface.

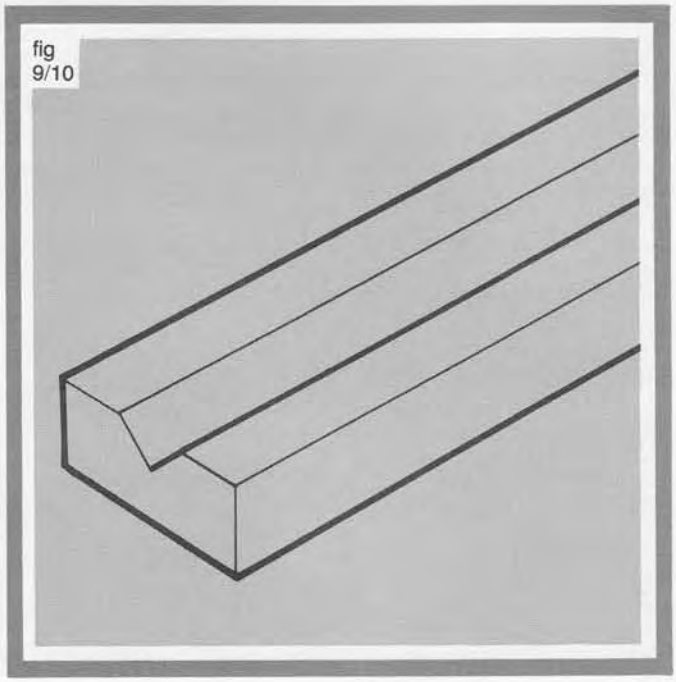


fig 9/10

Note: Other chuck-mounted accessories normally used with an electric drill, can also be fitted either directly to the chuck attachment or via a flexible drive.

Appendix 1

Safety

APPENDIX 1

SAFETY

Safety First!

All machines possess an element of potential danger, but are perfectly safe if certain procedures are adhered to. The following points should be observed at all times when the machine involved is a Radial Arm Saw:

1. Isolate the machine from the power supply when changing any blades or accessories and mounting guards.

2. Always ensure that the electric lead is in good condition, and that proper connections are maintained within the plug, particularly the earth connection.

3. Make certain that all blades and cutters are sharp, that they are the correct ones for the job in hand and are within the maximum sizes recommended for your machine.

4. The speed of feed should be appropriate to the cut being made. Never use force.

5. Ensure the working area is clear, and the floor free of debris.

6. Never allow children or other spectators in the vicinity of the machine when in use.

7. Never leave a machine running even if you are only away for a very short time. Switch it off and isolate the electrical supply.

8. Check and double-check that all clamping levers are properly engaged and completely secure.

9. Always check that guards are properly set, and adjusted to give maximum protection.

10. When using the saw make certain that the riving knife and anti-kickback device are properly adjusted for the nature of the work being carried out.

11. Wear eye protection.

12. Always ensure that the machine receives sufficient lighting for clear, safe operation.

13. Direction of feed of wood is always into the cutters, and against the direction of rotation. The exception to this is when cross-cutting, when the saw moves and not the wood.

14. If the motor stalls switch off right away. On the DW125, if the overload button is activated investigate the reason before re-setting.

15. When ripping, always use a push-stick to feed the material into the blade particularly for the last part of the cut.

16. Check that clothing is tidy, especially the cuffs, and never wear a tie.

17. When cross-cutting always return the saw to its parking position at the rear of the arm when the cut is completed.

For the sake of clarity, some of the photographs in this book have been taken without the guards being properly set. In practice the machine must never be operated without first fitting, and then correctly adjusting, the appropriate guard. The manufacturer's instruction leaflet supplied with the machine includes specific details of the proper guarding arrangements - make sure you follow these instructions to the letter.

Appendix 2

Saw Blades

APPENDIX 2

SAW BLADES, THEIR USE AND CARE

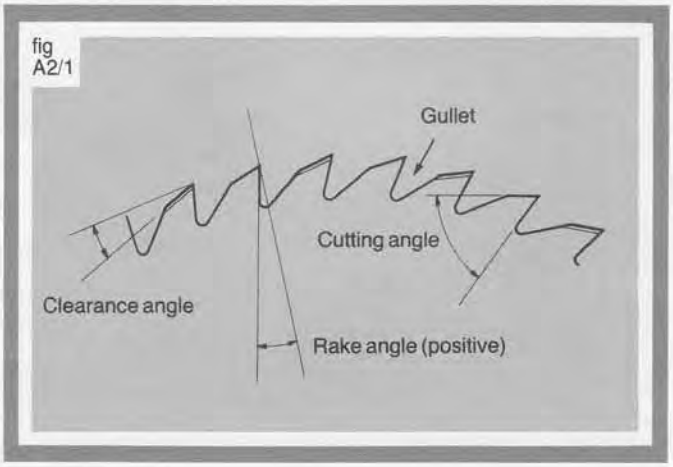
The Kindest Cut ?

In most cases the quality of a cut in wood is dependent on the blade or cutter, rather than the machine. Make sure that your blade is sharp, of the right type and correctly set. The correct speed is also important, circular saws should run with a peripheral speed of between 2,155 and 2,775 metres per minute. The Dewalt Powershop operates within these limits, with ample power to cut hardwoods even when the blade is set at maximum cutting depth.

The Powershop comes with a combination-type blade of plate steel, which cuts either across or along the grain – the latter is referred to as 'RIPPING'. The teeth angles of this blade are a combination of the rip blade and the crosscut blade type. As such they are suitable for hard woods and softwoods. Plate steel has a finely balanced temper and hardness. Hard enough not to blunt too quickly and soft enough to be readily sharpened by file.

Tooth Care

Fig. A2-1 shows a gullet tooth. As the blade passes through the wood, the gullet collects the sawdust which is then ejected as the blade rotates. Blades designed specifically for ripping thick softwoods have extra-deep gullets to allow for the greater amount of dust generated.

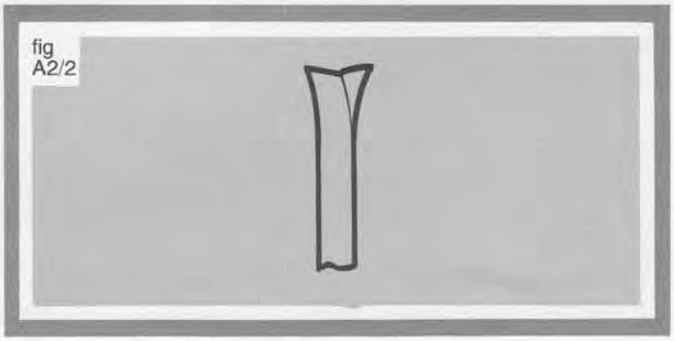


Rake angle can be positive, negative or zero. Softwoods prefer a positive angle of rake, whilst hardwoods a negative or zero rake. Again softwoods require a smaller cutting angle and so the clearance angle at the tooth top is greater. If the cutting angle for hardwoods is too small, the tip of the tooth will tend to dull more rapidly. The angle of slope on the top of the teeth is approximately 10°, to provide a distinct point to the outer end of the cutting edge. When cross-cutting the outer tip cuts the wood first and the grain fibres are thus severed for a clean cut. Blades intended solely for ripping have their top edges sharpened square across, and would tend to cut ragged if used for cross cutting.

Wood itself is an easygoing material to cut if you follow the rules, and the standard Powershop blade is quite efficient in ripping or cross-cutting both hard and softwoods.

Getting Set

'Set' is the slight bending outwards of the teeth to the left and the right, so that the actual cut (the kerf) is a little greater than the thickness of the blade. This is essential to provide clearance and improve the cutting action. Otherwise the blade would bind within the kerf, which would cause overheating and stall the motor. This is especially true of 'wet', 'woolly' or very thick woods. Less set is needed for hardwoods than softwoods, and more for 'green' timber than for dry. Normally, the bigger the teeth, the bigger the set. In fig. A2-2 one can see the set of a plate blade in the end view of a couple of teeth. This also shows the bevel on the top of the teeth creating the pointed outer



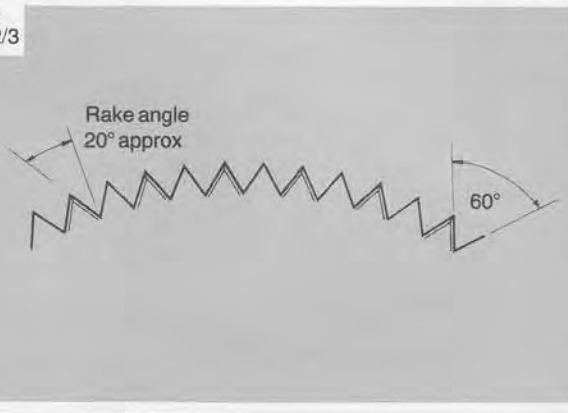
tips. With T.C.T. blades the tungsten tips are wider than the body of the blade, thus giving the necessary clearance within the kerf. Excessive set however is undesirable for a number of reasons. It is wasteful of both timber and power, making the cutting action less smooth and the surface rather ragged.

Alternative Blades

1. The Cross Cut Blade

Fig. A2-3 shows the teeth of the cross cut blade. They are sometimes known as 'handsaw teeth', and are much smaller and more numerous than on the general purpose blade. The angle at tip and root of the teeth is 60°, with a 20° negative rake angle. These blades do not perform well on ripping as they have no large gullet and a marked negative rake angle. They can rip well enough on thin wood up to 20mm thick, but this design is intended primarily for cross-cutting.

fig A2/3



2. Tungsten Carbide Tipped Blades

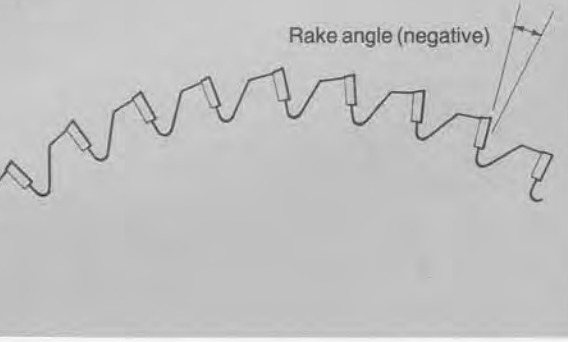
Due to their exceptional hardness and resilience, T.C.T. blades have many advantages over corresponding plate blades.

Firstly they give a very smooth cut, tackling very hard woods which would prove tough for plate blades. The resin content in certain materials like chipboard, plywood and blockboard dulls ordinary tool steel very quickly, but to a T.C.T. blade the effect is no different from cutting solid wood.

The life of a T.C.T. blade between sharpenings is fifty times greater than a plate blade, however it does require special equipment when sharpening, which cannot be undertaken in the workshop.

Due to their high efficiency, the tooth form and angles of T.C.T. blades become less critical and the popular pattern is again the general purpose type suitable for virtually all sawing operations. Widely spaced teeth ensure fast, efficient ripping at the expense of slightly diminished smoothness. Smaller, more numerous teeth produce a silky smooth cross cut especially suitable for highly accurate trenches and tenons. Typical T.C.T. teeth are depicted in fig. A2-4.

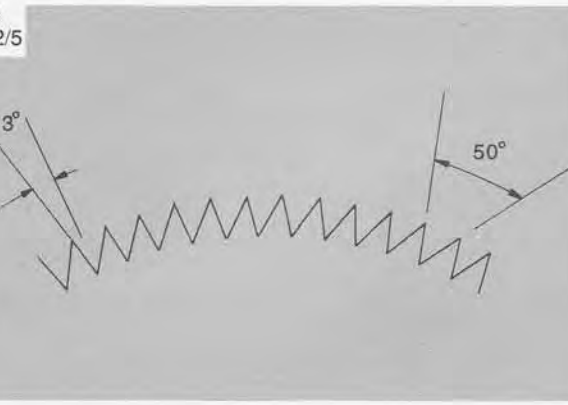
fig A2/4



3. Plastic-Cutting Blades

Plate saw blades are unsuitable for cutting plastics such as Perspex and Formica because of chipping. Although a small toothed T.C.T. blade will cut many plastics, the "hollow" section type will tend to shatter unless a plastic-cutting blade is used. As in fig. A2-5 they have very small teeth with an acute angle at the tip, which cope very nicely with a wide range of plastic materials.

fig A2/5



Take Care Of Your Blades

First of all, fit the right blade for the right job. For example exceptionally hard timber like teak, which has gritty deposits in the grain should not really be sawn with an ordinary plate blade.

The big danger to your blade will come from nails and screws embedded in the wood. Great care should be taken to remove nails which are visible, and to avoid those which may be concealed within the wood. This is particularly applicable to second-hand timber.

Sharpening Blades

T.C.T. blades must be sent to a special saw doctor for servicing, but ordinary plate blades can be partly maintained in good condition within the workshop. Blades can be kept up to scratch with a little interim filing, known as 'touching-up'. This can be carried out about six times before setting is required. Gullet repair is even more infrequent, being able to withstand long use and repeated sharpenings before being restored with special grinding gear.

Setting and gullet grinding is a task for experts, but touching up can be accomplished with little difficulty using a saw vice, as in fig. A2-6.

A piece of ply around 300mm x 100mm and 13mm thick is ideal for this exercise. Make a hole about 100mm from the top, and hold the blade within the vice with a 10mm bolt and wing nut. When in use the saw vice should itself be held in a bench vice.

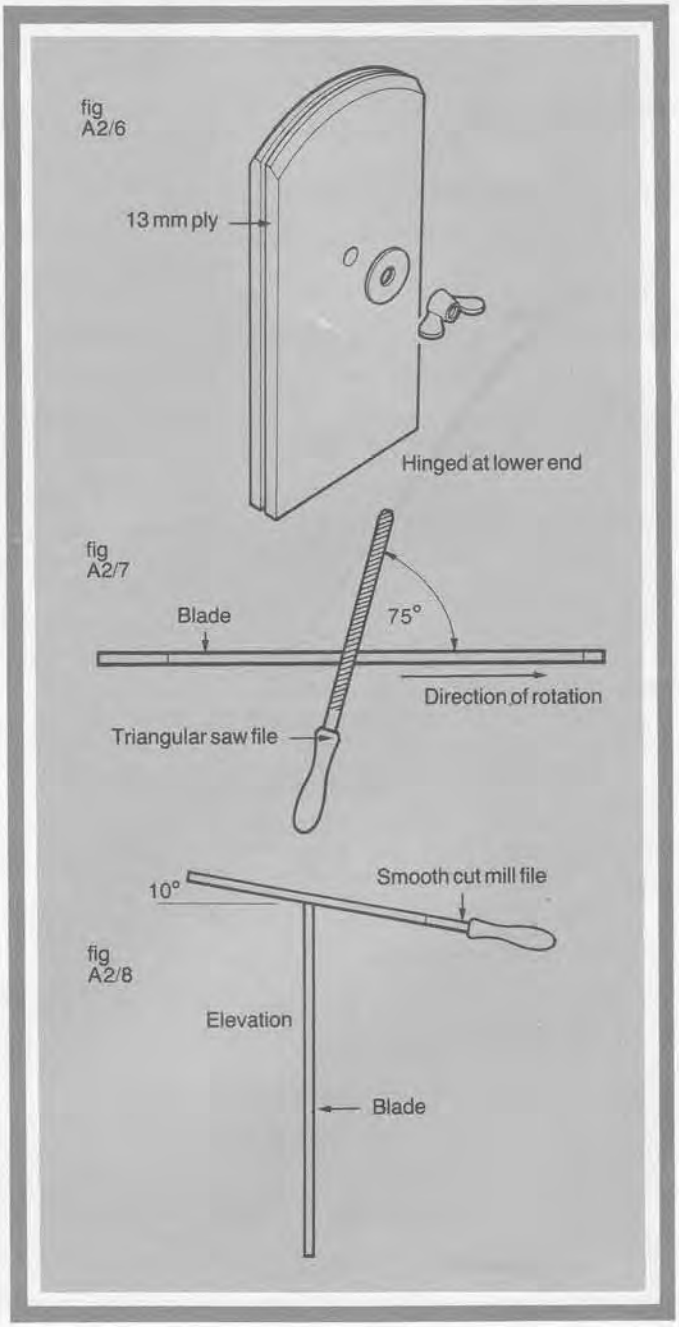
For the cross cut blade a triangular saw file is needed, these being made in various lengths, either double or single ended. Alternate teeth are filed from one side, the remainder from the other side. It is VITAL that every tooth receives the same number of strokes from the file to maintain the trueness of the blade. Two or three strokes should be sufficient. On no account give a tooth extra strokes as it will not then cut, being below the cutting circle of the rest.

Uniform downward pressure must be maintained. Fig. A2-7 shows the blade being filed, with the angle between file and blade about 75°.

A 'smoothcut' mill file about 200mm long is the type appropriate for a general purpose blade.

Again file alternate teeth from one side, then reverse the blade for the remainder. Point the file upwards by about 10° and angle slightly so that filing takes place towards the tip as in Fig. A2-8.

Due to the shape of the teeth, a 'knife file' has to be used for the plastic cutting blade. File 'square across' the back edge of the teeth, all of which can be dealt with from one side only.



Appendix 3

Adjustment

APPENDIX 3: MAINTENANCE AND ADJUSTMENT PROCEDURES FOR DEWALT POWERSHOP DW320 AND DW125 MODELS

The intention in this appendix is not to duplicate the information contained in the original instruction leaflet supplied with each new Powershop, but to highlight those checks and adjustments which will be necessary from time to time to make sure that your machine continues to operate accurately and efficiently.

It is therefore assumed that the reader has already had experience with the Powershop and does not require the same amount of detail as a complete newcomer to the machine would do. Most of the general comments apply to both models, whether you have a DW320 or a DW125. Wherever differences occur, these are highlighted in the text and the illustrations as appropriate. It was not felt necessary to repeat the photographs for each machine unless the differences were material to the adjustment procedure.

If your saw is cutting inaccurately, it is important to follow the sequence of checks/adjustments presented below and not just make the adjustment you think is necessary, as this could make a cut in another angle/plane inaccurate.

A. Table Adjustment

As you will know a fundamental requirement for accuracy with a Radial Arm Saw is that the table is absolutely parallel with the arm when viewed from both the front and the side.

A quick check to see if the table is parallel is as follows:

1. First check that the table itself is perfectly flat. This can be done with a long straight edge over the full length and width of the table. If there are gaps under the straight edge then the table is not flat and must be adjusted.

   It may first mean that the table is bowed in the centre in which case, with a screwdriver via the holes in the middle of the table surface, adjust the support screws up or down to compensate and check again with the straight-edge. If you cannot correct the bowing in this way, you probably need to replace the fixed table board with a new one.

2. Having checked the table surface for flatness, place the fence in its rearmost position in the table and lower the sawblade until it just touches the surface in the centre of the table in the 0°crosscut position.

   Now release the riplock and the mitre latch and mitre clamp and swing the arm gently across the width of the table and pull the sawblade backwards and forwards along the arm.

   If the tip of the blade just remains in contact with the table surface then the table is perfectly parallel with the arm and no adjustment is needed.

   If the blade binds anywhere on the surface, or loses contact with it, then all the boards must be removed from the support brackets and their adjustment checked.

3. Having removed the table boards, remove the guard and sawblade and its associated flanges from the motor arbor.

   Now tilt the motor through 90° so that the arbor points vertically downwards. In the same way as when you first set up your machine, use the tip of the motor shaft to act as a gauge along each of the side table supports, adjusting them up or down as necessary by slackening and retightening the retaining bolts in the slotted holes of the brackets (Fig A3–1 + A3–2).

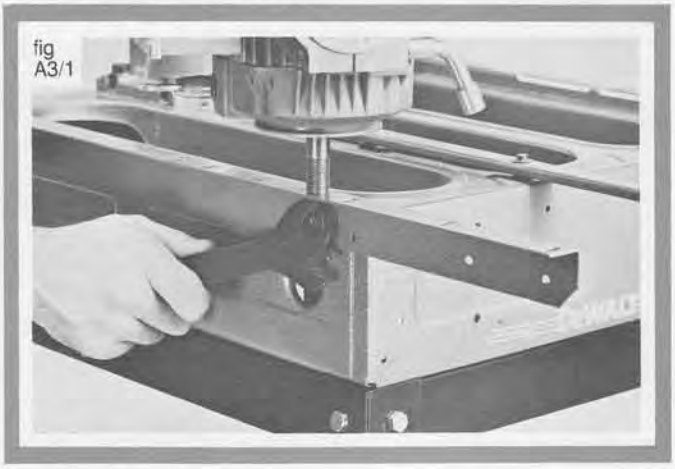


fig A3/1

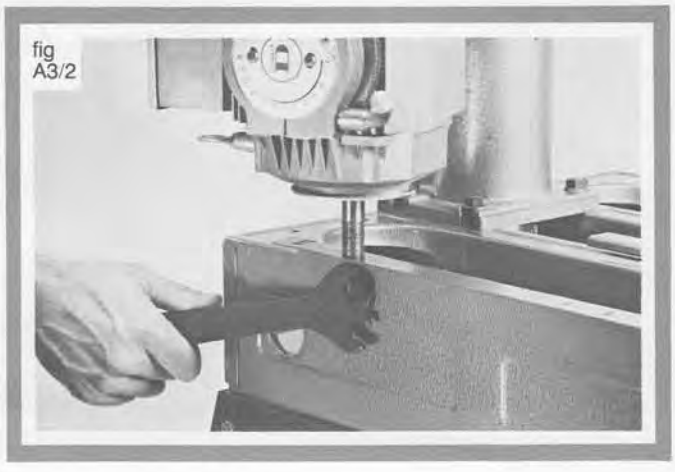
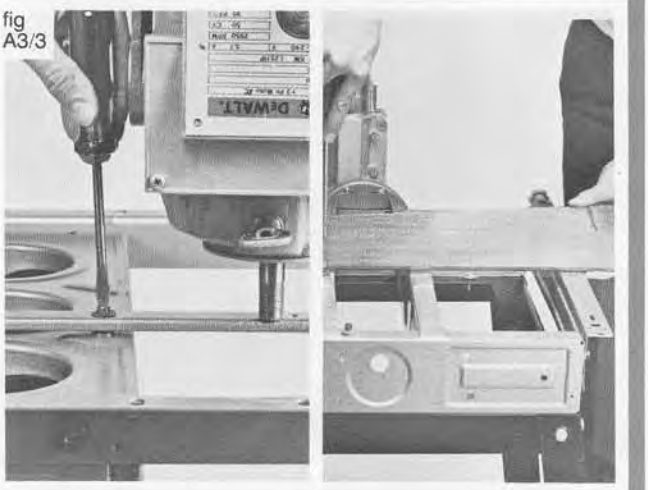


fig A3/2

Similarly, check the central table support and adjust that in the same way with a screwdriver. (Fig A3-3).

While checking the level of the brackets in this way, do not alter the height of the arm until the full procedure is finished and you are satisfied that the support brackets are each in exactly the same plane front and rear.

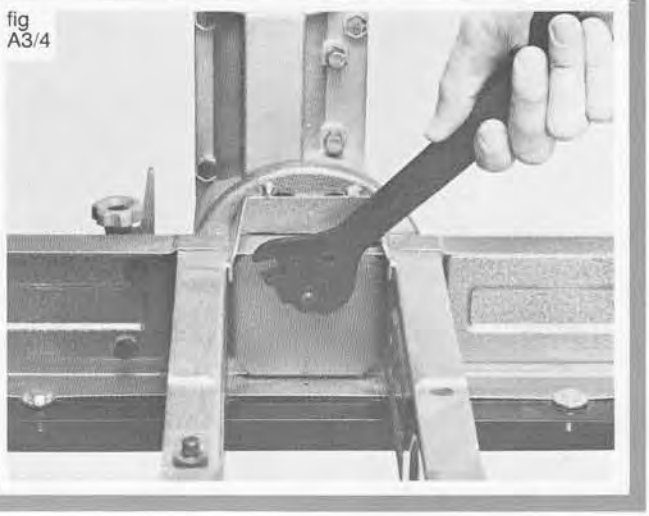
fig A3/3



DW320 Owners note:
If it is found to be difficult to adjust the two table support strips to the same level, the problem probably lies in the fact that the column is not perpendicular to the base frame. This can be checked and adjusted as follows:

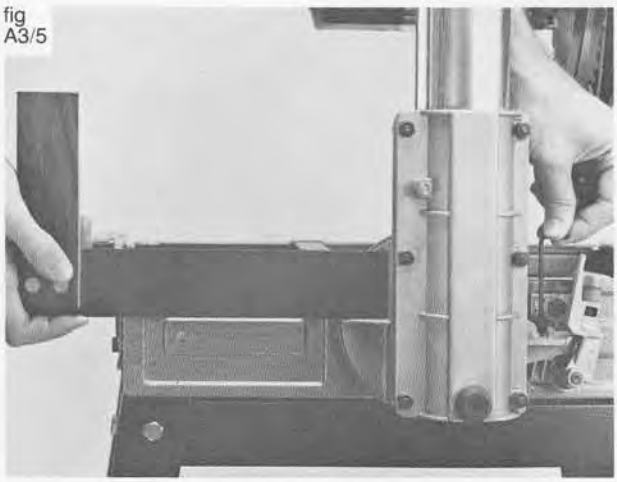
(i) Check that the nut on the pivot-bolt at the bottom of the column is secured (Fig A3-4). If your Powershop is frequently folded and unfolded you will need to check this nut from time to time and retighten it. Do not overtighten it or you will find it difficult to fold your machine for storage.

fig A3/4



(ii) Release the column-locking clamp and hold a square in the 90° casting on the pivot-bracket at the base of the column as shown in Fig A3-5. If the lower edge of the square does not line up with the bevel on the base cross member, adjust the stop on the other side of the column up or down as necessary and secure in the correct position with its locknut.

fig A3/5

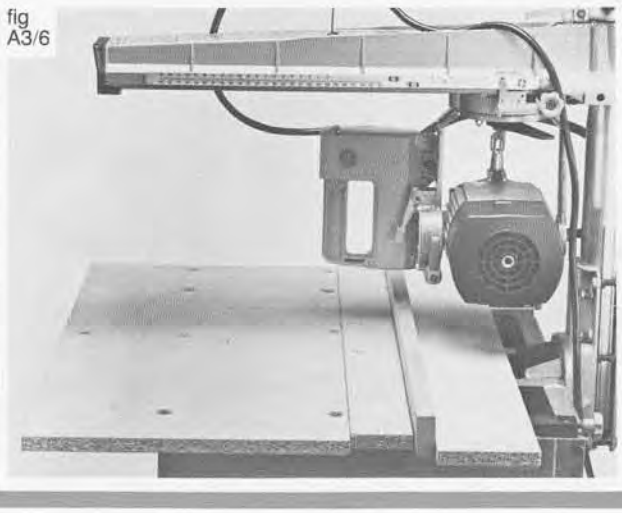


Lining it up visually in this way may not provide a perfect 90° right angle but this level of accuracy is sufficient since the remaining table adjustment procedure explained above will compensate for any slight misalignment.

4. The motor can now be returned to the horizontal position and the blade and guard remounted. Similarly, the table boards can be repositioned on the supports and secured as before. (Fig A3-6).

5. Check again as described in items (1) and (2) above to see that the upper surface of the table is both flat and level.

fig A3/6



B. Arm Adjustment

If your machine fails to cut an accurate 90° cross-cut when the arm is latched and clamped in the 0° position on the mitre scale, then the arm is not at 90° to the fence and adjustment is needed.

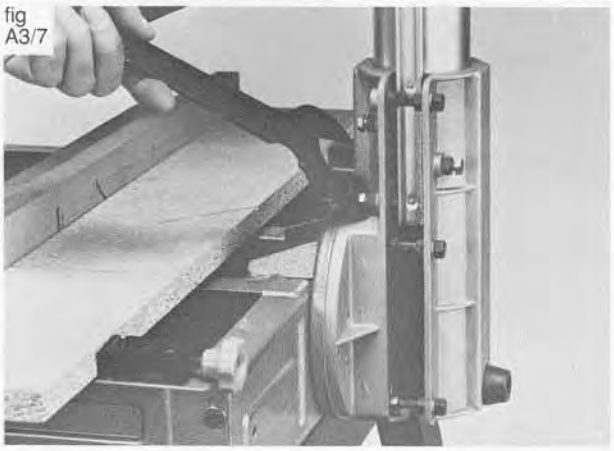
The method of adjustment is different for each model:

DW320 Owners note:-

(i) Slacken the locknuts on the brass screws which bear against each side of the key on the lower end of the column.

(ii) The brass screws should then be tightened (fig A3–7) or slackened depending on which side the arm was offset from the centre line.

fig A3/7



(iii) Once the column has been rotated sufficiently to give a straight 90° cut (and you may need to make several trial cuts across a wide board to confirm this) then the lock nuts can be retightened. In doing this, the screws should be tight against the key on the column but not so tight that they restrict up and down movement of the column when the elevating handle is rotated.

DW125 owners note:-

(i) With the mitre latch engaged in the 0° position, slacken the mitre clamp.

(ii) Loosen the lock nuts on each side of the arm, as shown in Fig. A3–8.

(iii) Release the mitre latch and depending on which way the arm needs to move to give the true 90° crosscut required, loosen and tighten the adjusting flanges on either side of the arm (fig. A3-9). If the front of the arm needs to go to the left, loosen the adjusting flange on the right of the arm and tighten the flange on the left. If the opposite is the case, and the arm needs to move to the right, loosen the adjusting flange on the left and tighten the flange on the right. Adjust the flanges a little at a time and re-engage the mitre latch and clamp and check the cross cut travel of the blade relative to the fence with a square. Do not overtighten the adjusting flanges or the mitre latch will be too stiff to operate easily.

fig A3/8

(iv) Once satisfied that the cross-cut travel is accurate, re-tighten the lock nuts on each side of the arm (as in Fig. A3-8).

(v) Adjust the pointer on the mitre scale so that it registers 0° on this position.

fig A3/9

C. Yoke Adjustment

If the blade cuts a kerf wider than the set of the teeth and/or causes scorch marks on the timber being cut or severe splintering on one side of the cut, then the blade is not parallel to the arm tracks along which the yoke assembly travels. If the blade is out of adjustment in this way, it will be particularly noticeable when ripping, since the blade will either tend to jam as it forces the timber against the fence or cause the timber to move away from the fence as it comes past the blade.

To adjust, proceed as follows:–

(i) With the rip-locating slide bar engaged and the yoke clamp tightened, grasp the yoke in both hands and check it for movement left or right. If there is movement, tighten the nut on top of the slide bar casting to increase the friction between the slide bar and the yoke turntable.

(ii) Then if the blade is still not parallel (checking it with a square against the fence – Fig. A3-10), release the yoke clamp and loosen the lock nuts (Fig. A3-11).

(iii) Now turn the yoke slightly to left or right until the blade is in fact parallel to the arm tracks. Then tighten the yoke clamp and the lock nut.

Having adjusted the yoke assembly in this way, release the rip lock and pull the saw carriage forward. Raise the sawblade just off the table surface, place the blade in the in-rip position and (with yoke clamp tightened and lifting the plastic blade guard if you have it fitted) rest the blade against the fence. (Fig. A3-12).

If the blade is completely flat, across its face, against the fence, this will confirm that the saw will perform accurate parallel rip cutting. If, by any chance, the blade does not lie flat against the fence then return it to the 90° cross-cut position and repeat the yoke adjustment procedure described above.

fig A3/10

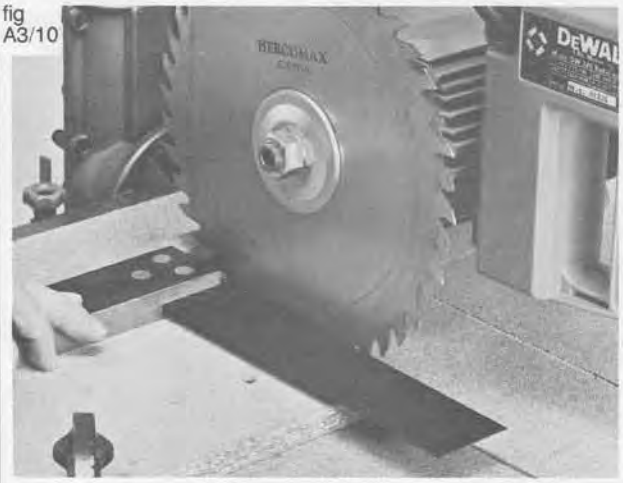


fig A3/11

fig A3/12

D. Perpendicular Blade Adjustment

For accurate woodworking it is also necessary that the sawblade cuts a precise 90° vertical line when intended to do so (marked as 0° on the bevel scale). If this is not so, the blade will also not cut an accurate 45° bevel and it will be difficult to set up compound mitre cuts with any real precision.

If you suspect that the blade is not perpendicular to the worktable when set at 0° on the bevel scale (with bevel latch and clamp secured) check it with a square (Fig. A3-13) and if necessary adjust as follows:–

(i) Remove the bevel pointer disc **(DW320 owners:** *raise bevel latch to allow access to screws).*

(ii) **DW320 owners** *(Fig. A3-14): Loosen the now exposed right-hand allen screw and re-engage bevel latch.*

DW125 owners *(Fig. A3-14a): Loosen the two outside allen screws.*

(iii) Tilt the motor left or right until the blade is flat against the square.

(iv) Firmly retighten the allen screw(s).

(v) Replace the bevel pointer disc.

NOTE: It may be necessary to loosen the centre allen screw slightly before the motor will tilt. If you do so, be sure to secure it again firmly before replacing the bevel pointer disc.

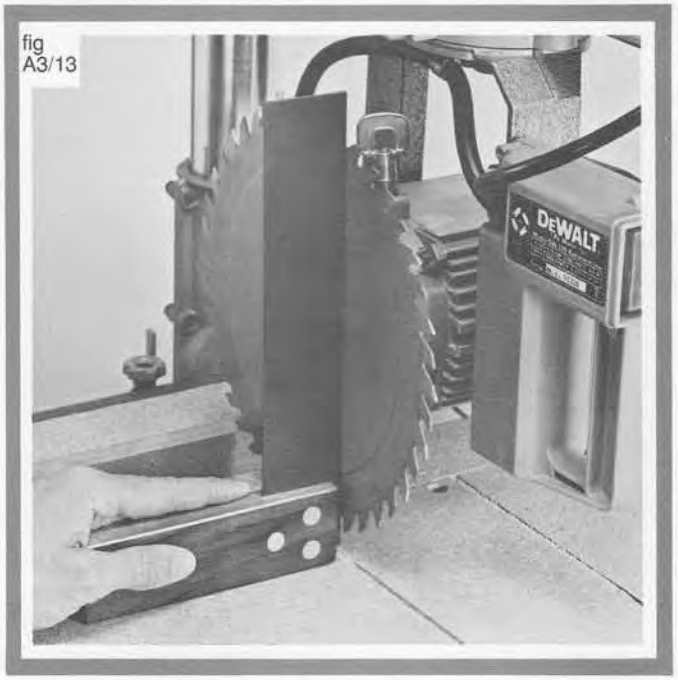


fig A3/13

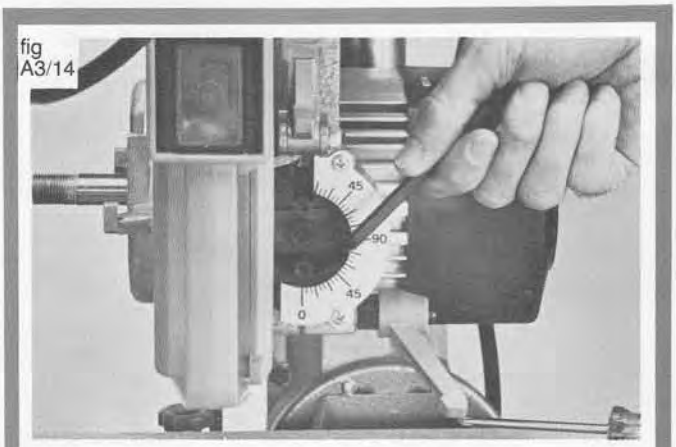


fig A3/14


fig A3/14a

E. Roller Head (Yoke Assembly)

In most cases the above adjustments A-D will be all that are necessary to correct any inaccuracies in your Powershop.

However, in time it is possible that play might develop in the adjustment of the roller head bearings to the arm tracks which will cause inaccuracy. For example, it will be difficult to cut an accurate straight line because the yoke assembly will tend to jump from side to side within its tracks.

Adjust as follows:–

(i) Pull the yoke assembly forward to the end of the arm tracks and lock it in position with the rip lock.

(ii) **DW320 Owners:** *remove the arm end-cap by withdrawing the Phillips screws and tapping the end cap downwards. (Fig. A3-15).*

With an allen key, loosen the locking screw as shown. (Fig. A3-16.). Then, with a 13mm box spanner or socket, turn the right hand bearing via the access hole underneath the carriage. It will only need to be moved a fraction of a turn, until it is sufficiently in contact with the arm track to ensure that all bearings rotate as the yoke assembly is moved backwards and forwards along the arm. Once satisfied adjustment is correct, retighten the locking screw with the allen key and replace the arm end-cap.

DW125 Owners: *remove the rip scale pointer on the right of the yoke assembly by withdrawing the two Phillips screws.*

With the rip scale pointer removed, you have access with an allen key to the locking screw as shown. (Fig. A3-17). Having slackened this screw, also loosen the 13mm lock nut immediately

fig A3/15

fig A3/16

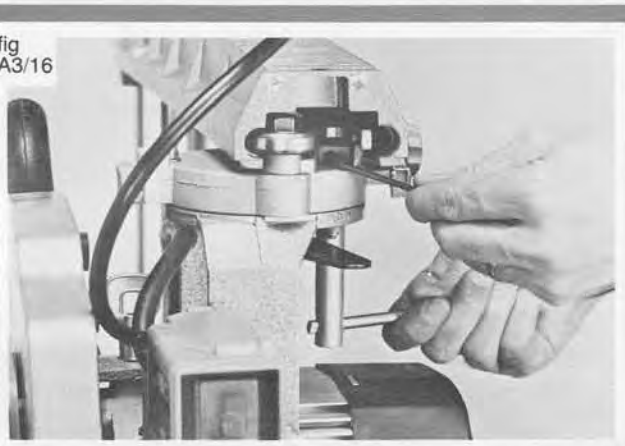
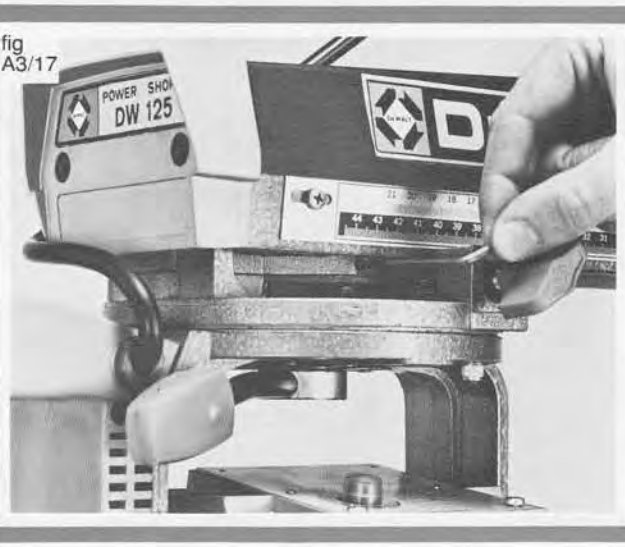


fig A3/17

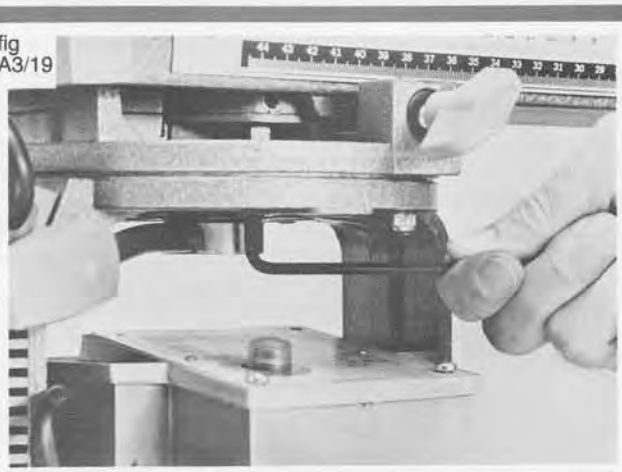


beneath it. (Fig. A3-18). Then release the rip lock and with an allen key via the access hole in the underside of the yoke (Fig. A3-19) rotate the eccentric bearing slightly until it is sufficiently in contact with the arm track to ensure that all 3 bearings rotate as the yoke assembly is moved backward and forwards along the arm. If you find it difficult to feel when the adjustment is correct, you may find it easier if you remove the Arm end-cap so that you can see the 3 bearings rotating in the tracks. Once satisfied that the adjustment is correct, retighten the 13mm lock nut and then the horizontal allen screw and replace the ripscale pointer.

NOTE: The top and bottom edges of all three bearings should be in contact with the arm tracks over their entire length and the roller head assembly should move freely but without side play.

fig A3/18

fig A3/19



F. Column/Base Adjustment

The following adjustment will also normally be unnecessary unless your Powershop has been moved frequently from site to site.

If, after, the mitre latch is engaged in the 0° straight cross-cut position and the mitre clamp is secured, there is still side, or up-and-down, movement at the front end of the arm caused by the column moving in its base, the following adjustment is necessary.

DW320 Owners

(i) *Loosen the 3 lock nuts on the brass bolts bearing against the key on the side of the column. (Fig. A3-20).*

(ii) Loosen the 3 brass bolts slightly.

(iii) Turn the elevating handle to move the column up and down. If the base is seen to be slack around the column, adjust by loosening the nuts (A) and tightening the nuts (H) for the correct fit. Avoid binding of column and base by over-tightening. If the base is too tight around the column, adjust by unscrewing nuts (H) and tightening nuts (A) for the correct fit.

(iv) Tighten brass bolts (B) against the key on the column and lock nuts (E) to prevent the column from rotating inside the base.

DW125 Owners:

(i) Loosen the lock nuts (Fig. A3-21) on the 2 brass allen screws on the left of the base (looking from the rear) and then slacken the inner brass screws with an allen key.

(ii) Check that nuts X in Fig. A3-22 are tight against the right-hand upright of the base.

(iii) Turn the elevating handle to move the column up and down. If the base is seen to be slack around the column, adjust by unscrewing the two nuts 'A' on the long black bolts and tightening the outside nuts 'H' until the correct fit has been achieved. Avoid binding by overtightening.

If the base is too tight around the column, adjust by unscrewing nuts (H) and tightening nuts (A) for correct fit.

(iv) Retighten the brass screws against the key on the back of the column and set the lock nuts to hold them in position.

CAUTION After carrying out this adjustment, check again the straight cross-cut travel is at 90° to the fence and adjust if necessary

fig A3/21

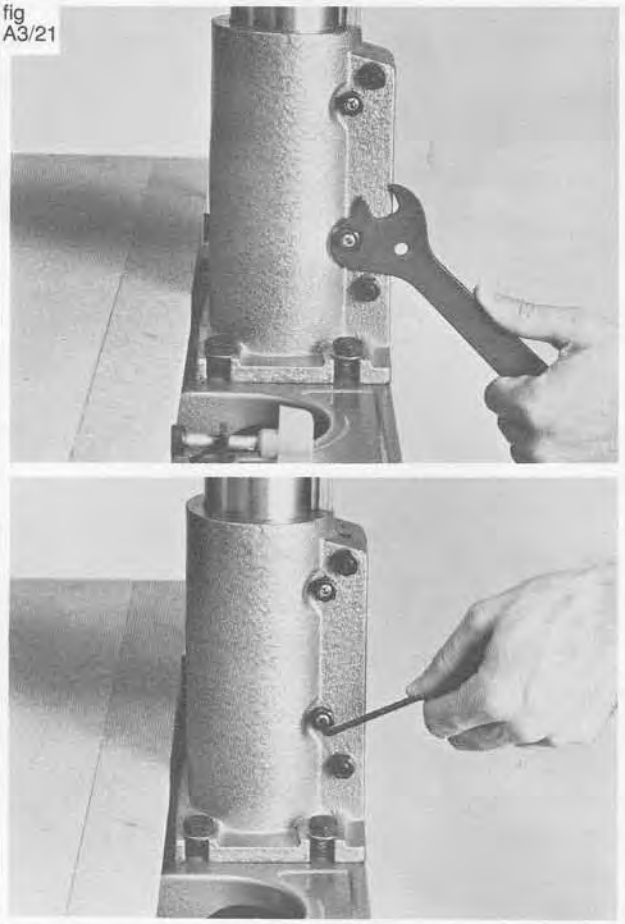


fig A3/20

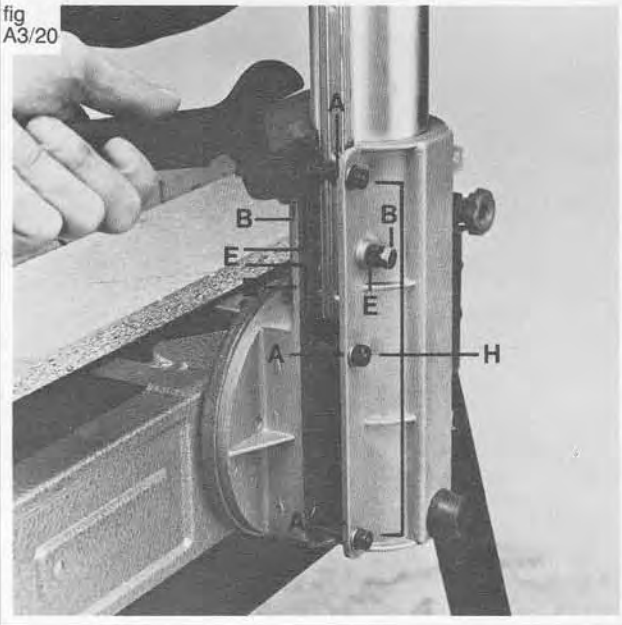
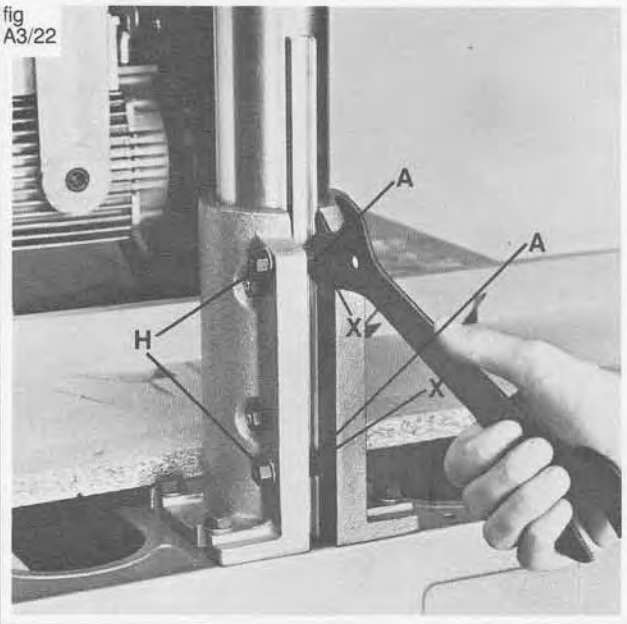


fig A3/22



G. Clamp Handle Adjustment

(i) The Mitre Clamp handle may need to be adjusted if its secure position means it hinders use of the elevating handle. In such a case, simply slacken the clamp handle and push it into the casting so that the nut on the other end protrudes from its surrounding casting. You can then tighten up the nut half a turn and pull the clamp handle back out so that when it is again retightened it does not obstruct the elevating handle.

(ii) The Bevel Clamp handle may be adjusted in the same way as in (i) above but you may find it easier to do so with the motor in its vertical position.

(iii) The adjustment of the yoke clamp handle is a little more involved and it differs from model to model.

If you find that the yoke clamp has insufficient movement to satisfactorily clamp the yoke securely, adjust as follows:

DW320 Owners

(a) Carefully remove the rubber 'O' ring immediately beneath the clamp handle (Fig. A3-23) with your thumbnail or a screwdriver.

(b) You will then be able to use the handle as a spanner on the large centre nut (Fig. A3-24) and tighten it until it is possible to slacken and tighten the clamp within the normal arc of the handle in its fixed position.

(c) Replace the 'O' ring in position beneath the clamp handle. (Fig. A3-25).

fig A3/23

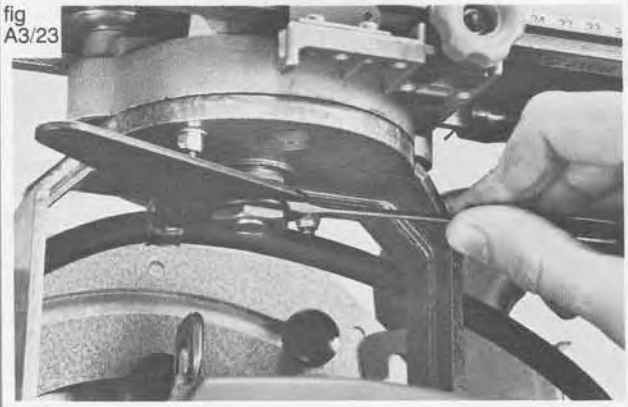


fig A3/24

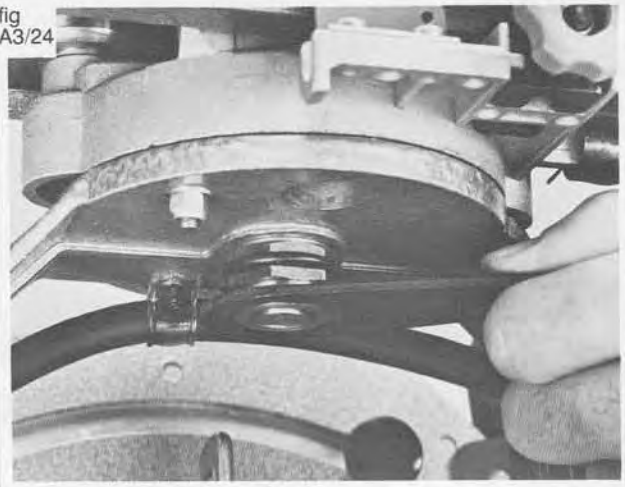
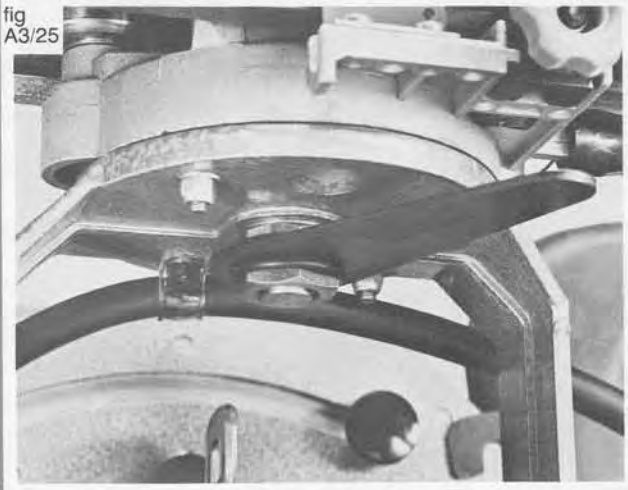


fig A3/25



DW125 Owners

(a) Remove the arm end-cap (Fig. A3-26).

(b) Remove the complete yoke assembly from the arm tracks (A3-27).

(c) While levering the spring steel locking flange downwards with a screwdriver (as shown in Fig A3-28 inset) so that it will pass over the lug on the yoke casting, turn the central bolt in the top of the yoke (Fig A3-28) with a large screwdriver so that the locking flange underneath moves on one segment past the lug.

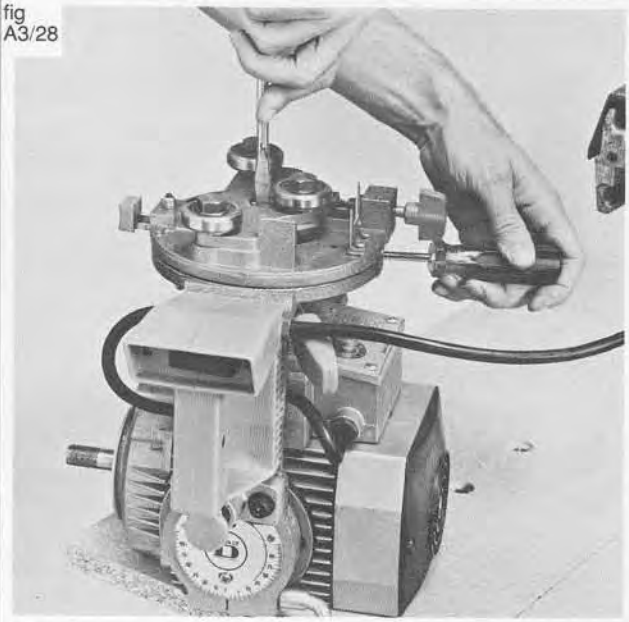
(d) Having removed the small screwdriver used as a lever, check that the clamp does lock satisfactorily within the movement arc avillable and then return the yoke assembly to the arm tracks.

NOTE: While the yoke assembly is removed from the arm, take the opportunity to clean the bearings and the arm tracks with a clean dry cloth. (Fig.A3-29).

fig A3/26

fig A3/27

fig A3/28



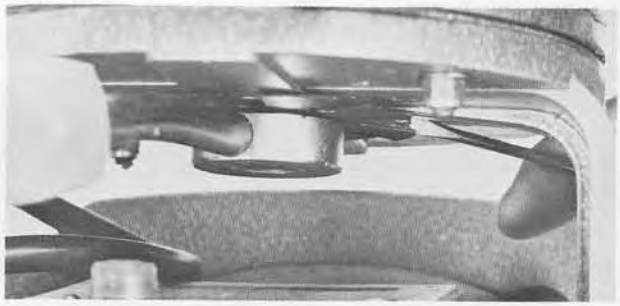


fig A3/29

Hints on General Care of your POWERSHOP

1. Keep the machine clean for efficient operation. A build-up of dust in the immediate vicinity of the machine could be hazardous and lead to inaccuracy.

2. When changing or remounting the sawblade, make sure that the blade and adjacent flanges are clean before securing.

3. Keep the worktable clear of sawdust. Just a small amount of dust between the fence and the material to be cut could cause inaccuracy.

4. From time to time wipe the arm tracks with a clean, dry cloth to eliminate dust build-up which can ensue particularly after a lot of rip cutting or sanding. To clean the arm tracks and the 3 yoke bearings, you may find it easier to detach the arm end cap and remove the yoke assembly completely from the tracks. White spirit can be used if necessary to remove compacted dust.

   If you remove the yoke assembly, when replacing it be sure to tighten the retaining screws in the arm end cap securely.

5. Never attempt to lubricate the surface of these bearings or the arm tracks, as this can cause premature wear and inaccuracy.

6. When carrying your Powershop resist the temptation to lift it by gripping the worktable – grip the base frame instead. If you lift it by the worktable you risk twisting it and therefore reducing the accuracy of your machine.

Appendix 4

Materials Guide

APPENDIX 4

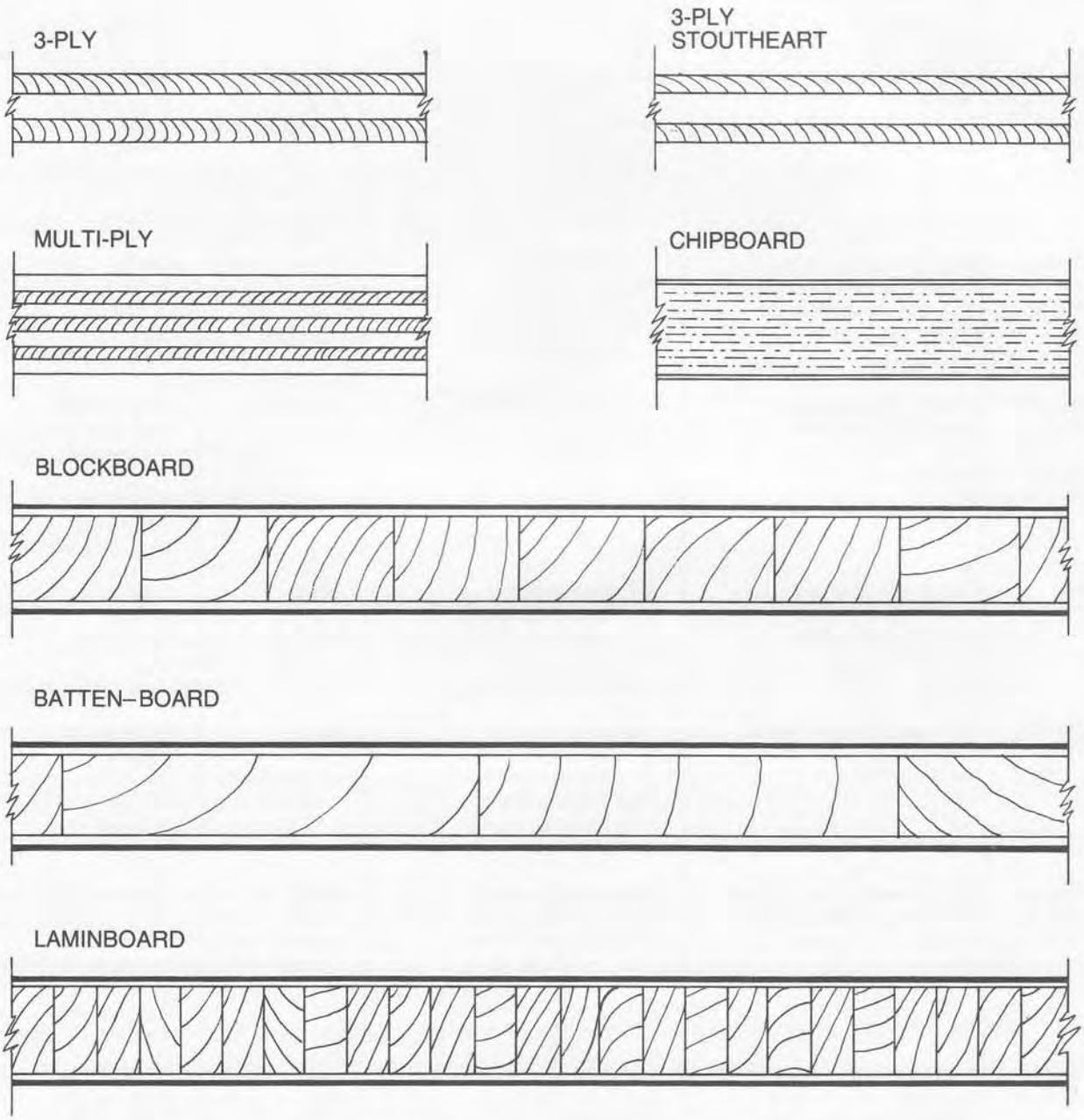
BRIEF GUIDE TO THE MORE COMMON MATERIALS USED

The following notes outline the natural and man-made materials used most frequently in woodworking and home improvement projects. It is advisable to wear a protective face mask when woodworking with any material but particularly important when cutting resinous or fibrous materials, which can be very harmful to the lungs.

(A) MAN-MADE MATERIALS

TYPE	GENERAL DESCRIPTION	WORKING QUALITIES	BLADE BLUNTING EFFECT	USES
3-PLY	Made by bonding plies together with grain of one ply at right angles to those adjoining. Will not shrink, swell or split.	Cuts well with the grain, can splinter a little when cross cutting. A fine toothed T.C.T. blade is essential for smooth cut combined with accuracy.	Moderate	Cabinet backs, drawer bottoms, toys, panelling, Marine grades used for boat building.
3-PLY STOUTHEART	Less flexible than the above because of balance of plies.	As 3-ply	Moderate	As 3-ply
MULTI-PLY	Thickness from 6mm to 25mm or more. Usually an odd number of plies so that grain of outer ones runs in the same direction.	As 3-ply	Moderate	Simple furniture, boxes, toys, panels.
CHIPBOARD	Core of compressed wood particles bonded together with resin glues. Board may be faced with veneer, or can be plastic coated.	Saws well, can be rebated, trenched and grooved but edges cannot be moulded.	Moderate	Furniture built-in, fitments and kitchen units.
BLOCKBOARD	Strip cores around 20mm wide. Faced with one (sometimes two) plies. Available with veneered faces.	Saws well, can be rebated, trenched and grooved but edges cannot be moulded.	Moderate	Furniture and fitments.
BATTEN–BOARD	As above but wider core strips. Rarely veneered as this is a cheaper product.	As blockboard	Moderate	Cheaper work where a wide board is needed.
LAMINBOARD	As blockboard but narrow core strip, usually around 6mm wide. Very stable, therefore often veneered.	As blockboard	Moderate	Good quality work, cabinets, furniture and fitments.

(A) MAN-MADE MATERIALS



(B) METALS

YOUR DEWALT POWERSHOP IS NOT SUITABLE FOR CUTTING METALS, WHETHER FERROUS OR NON–FERROUS.

(C) PLASTICS

Blades are also available for DeWalt Powershops to enable plastics to be cut. Cutting corrugated plastic or fibreglass calls for particular care. Always use a good, sharp blade. If possible, clamp the material to the table while cutting and take slow, steady cuts.

(D) SOFTWOODS IN COMMON USE

TIMBER	GENERAL DESCRIPTION	WORKING QUALITIES	BLADE BLUNTING EFFECT	USES
DOUGLAS FIR/ COLUMBIAN PINE	A reddish-brown in colour with a uniform texture. Generally straight grained.	Works fairly easily, but slightly more difficult than Pine. Tends to splinter at tool exit.	Moderate	Heavy construction work and piling, Interior and exterior joinery.
WESTERN HEMLOCK	A non-resinous softwood. Straight grained, and of an even texture. Pale brown in colour.	Works readily as long as tools are sharp. Some chipping on end grain work.	Mild	Mainly construction work, joinery, vehicle building, etc.
EUROPEAN LARCH	Straight grained, and relatively free from knots. Usually pale reddish colour.	Saws and machines fairly readily with a mostly clean finish.	Moderate	As poles for pit props, piles, stakes, etc. Also sawn for exterior work, boat planking, etc.
PARANA PINE	Generally brown in colour. Straight grained, and with a uniform texture.	Easy to machine with little dulling effect. Gives clean, smooth finish.	Mild	Internal joinery, doors, etc.
EUROPEAN REDWOOD (SCOTS PINE) 'PINE'	Very varied due to wide range of species. Mostly a reddish-brown in colour.	Some resistance to cutting. Trouble can be experienced both with resin, and loose knots.	Mild	All types of joinery, furniture, house–building, etc.
EUROPEAN WHITEWOOD (SPRUCE)	Colour varies from almost white to pale yellowish-brown.	Easy to work and finishes well with sharp cutters.	Mild	General joinery, and carpentry. Cheaper furniture, boxes, etc. Tongue-and-groove.
WESTERN RED CEDAR	A reddish-brown colour. Non-resinous, with a rather coarse texture.	Machines fairly easily with a good finish. Some splintering on end grain work.	Mild	Used where light-weight is necessary such as glasshouses, weather boarding, and interior finishing.

(E) HARDWOODS IN COMMON USE

TIMBER	GENERAL DESCRIPTION	WORKING QUALITIES	BLADE BLUNTING EFFECT	USES
ABURA	A pale reddish-brown to light brown wood. Usually, straight grained, and of fine texture.	Works well,and cleanly, with a good finish.	Generally Moderate	Interior joinery, cabinet work flooring, etc.
AFROMOSIA	Brownish-yellow in colour with darker streaks, and mottling. Fine textured with straight inter-locked grain.	Easily worked with only a slight tendency to pick up.	Moderate	First quality joinery, shop-fitting flooring, etc.
ASH	White to light brown in colour, and straight grained. One of the best bending woods.	Works fairly easily, with smooth finish, although a tough timber.	Moderate	Sports goods such as tennis rackets, hockey sticks, etc.
BEECH	Varying from pale brown to light reddish-brown. Straight grained with a fine even texture.	Fairly tough when dry, but works fairly readily, with a good finish.	Severe to Moderate, Variable	Furniture, cabinet making, brush handles. *The most used hard wood.*
BIRCH	White to light brown throughout. Straight grained, and fine textured.	Works fairly easily in most operations, with good finish.	Moderate	Used in the furniture trade, and for tool handles.
ELM	Dull brown in colour, with a coarse appearance. Cross grained with irregular growth rings.	Works fairly readily but with some picking up when planing.	Moderate	Furniture trade, fruit and salad bowls, coffins, etc.
KERUING (YANG)	Greyish white to brown sapwood, and red-brown heart-wood. Straight grained with rather coarse texture.	Not too difficult to work, although resin clogging and licking up occur.	Moderate to Severe	Flooring and construction work.
IROKO	Golden brown in colour, and is very hard, and strong. Coarse texture, and interlocking grain. Sometimes contains calcareous deposits known as stone.	Works fairly well, but has dulling effect on tools, especially if stone is present.	Fairly severe	Window frames, sills, stair-treads, and flooring.
MAHOGANY	Reddish-brown to rich dark red in colour. Medium texture with either straight or interlocked grain.	Works readily with a smooth finish.	Moderate	Mainly furniture, but also high class joinery, and pattern work.

(E) HARDWOODS IN COMMON USE Cont'd.

TIMBER	GENERAL DESCRIPTION	WORKING QUALITIES	BLADE BLUNTING EFFECT	USES
MAKORE	Usually blood red or red brown with a fine texture.	Fairly difficult to work due to rapid blunting, and gumming up.	Severe	Mainly used for veneers.
MAPLE	White coloured with a reddish tinge. Has a fine even texture, and is usually straight grained.	Rather hard to work with cutters tending to ride, and some vibration in sawing.	Moderate	Furniture, cabinet making, flooring and panelling.
MERANTI	Light brown in colour. Coarse even texture, and usually straight grained.	Fairly easy to work, and gives a good finish.	Moderate to Severe	Interior joinery, shopfitting, and some furniture.
OAK (U.S. & EUROPEAN)	Usually a yellowish-brown colour with a straight grain. A heavy wood.	Working properties tend to vary, but are generally fair.	Moderate Variable	Window sills posts, and rails.
OAK	Yellowish brown, and paler than European.	Quite easy to work, and gives a good finish.	Mild	Joinery, furniture, and cabinet work.
RAMIN	A pale straw colour. It has a fine texture, and is straight grained. Rather heavy.	Easily worked, and takes a good finish.	Moderate	General joinery, and furniture.
SAPELE/ UTILE	A reddish-brown (rather like Mahogany). Close texture, and with varied grain.	Works well, although with some picking up.	Moderate	Mainly used in veneer form, but also used solid for decorative joinery.
SYCAMORE	Usually yellowish white in colour. It has a fine texture, and the grain is mostly straight.	Can be difficult on some operations. Tends to bind on saw and burn in cross-cutting. Planing, and most other operations are fairly easy.	Moderate	Bobbins, brush handles, and other turnery work.
TEAK	Mainly dark golden brown. Straight grained with a moderately coarse texture. One of the most valuable timbers in the world.	Works well with all machines as long as cutting edges are maintained. Gives a good finish.	Fairly Severe	Can be used for practically all building, joinery, and construction work.
WALNUT	Variable in colour with a greyish brown background. Has a natural wavy grain, and variable texture.	Moderately easy to work, and saws well.	Moderate	Used both as veneer and solid in the furniture and fancy goods trade.

Appendix 5

Sample Projects

APPENDIX 5 TWO SAMPLE PROJECTS ILLUSTRATE HOW A DEWALT POWERSHOP TRANSFORMS YOUR WOODWORKING

Techniques Used

Rather than duplicate unnecessarily the detailed text and illustrations on the various operating settings and adjustments given earlier in the book, the project instructions refer the reader back to the relevant sections as required.

Both projects are quite straightforward, but do serve to show how the versatility and precision of the DeWalt Powershop can be utilised. As you become more familiar with your Powershop and combine it with more of the attachments, the increasing sophistication of your woodworking will be limited only by your ingenuity in using the machine.

The preparation of the components is presented in a conventional sequence, describing how to prepare individual components completely in turn. You may, however, find that it saves you time if you do all of the jobs necessary using one particular attachment/ accessory and hence avoid having to constantly mount and disassemble the various tools on your Powershop. Illustrations are given in the margin to indicate which accessories are being used for each part of the project.


fig P/1

A. Occasional Table

Material Used:
- Red Deal, otherwise known as 'Pine' was used for the table illustrated, although a wide range of hardwoods could also be chosen.
- 10 right/angled shrinkage plates
- 8 mm dowelling
- 4mm wood screws

Cutting List:

No.	Description	Length	Width	Thickness (mm)
4	Legs	405	50	32
2	Side rails	620	75	20
2	End rails	400	75	20
1	Top	825	430	20

(Top comprises 3 strips of board initially 150mm wide each).

Note: Widths and thicknesses are net, but an allowance has been added to the lengths.


fig T/1

Equipment Used

1. Dewalt Powershop DW320 or DW125, together with the following optional attachments:


Router Mounting Bracket


Dado Head (as a better alternative to repeated passes with the standard saw blade).


Drill Chuck


Sabre Saw


Drum Sander

2. Black & Decker DN66 Woodworker (or similar router with 43mm Ø collar in the case of the DW320). If a 1984 model (or earlier) DW125 is used a router with a motor housing diameter of 88mm is the only one compatible with the mounting bracket available at the time of writing.
3. As an alternative to the Sabre Saw attachment:

   – Portable Electric Jigsaw or Stationary Band Saw.
4. Home-made Taper-Sawing Jig.
5. Orbital Sander or Belt Sander
6. Mortise or Marking Gauge
7. 10mm Wide Chisel
8. Hand Plane or Electric Portable Planer

Preparing The Components

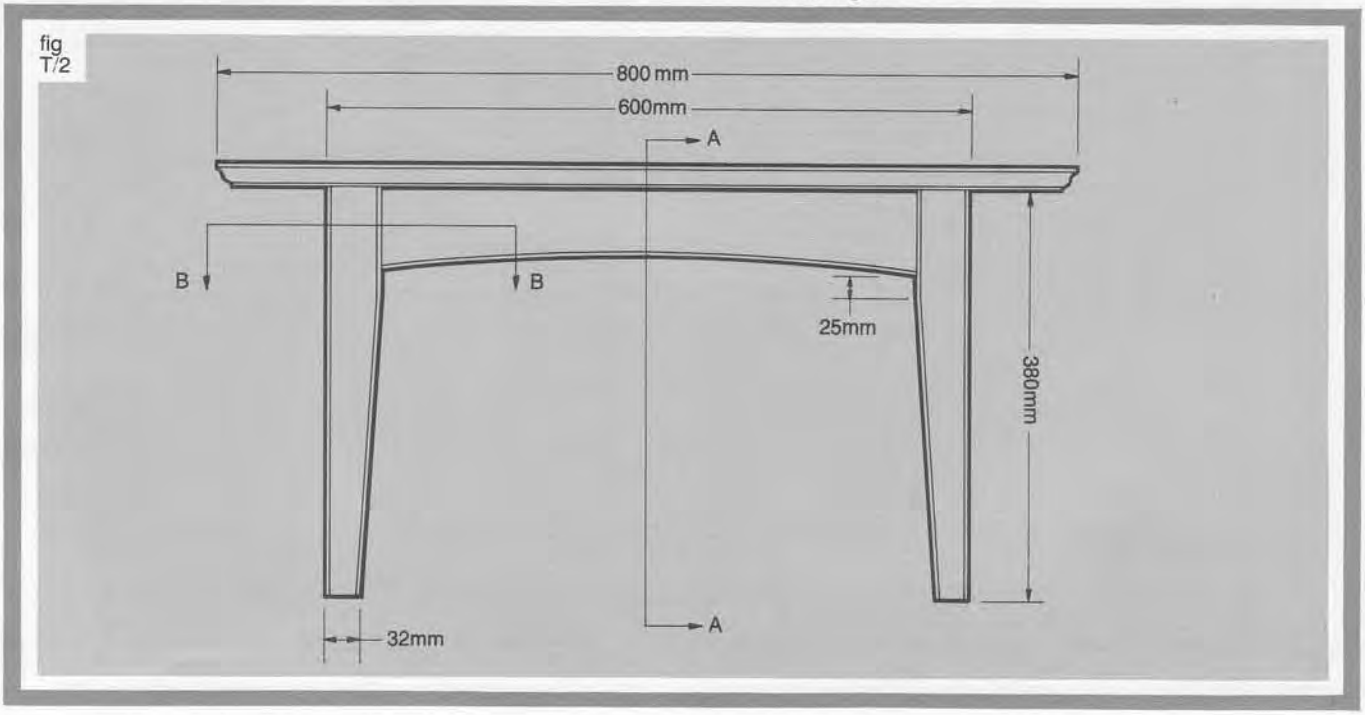
The sizes shown in the drawings produce a table of good average proportions as the photograph T-1 illustrates.

Start by preparing the wood for the rails and legs, keeping all the material parallel initially, since shaping must be done at a later stage.


Cross cut the rails to their final lengths but leave the legs with a little waste at each end for now. The legs are marked out while held together in pairs.

Fig T-2 With a square, mark a line across the top of the legs to indicate the waste at the ends and then, holding a rail piece end-on against that line, mark another line immediately below the rail to indicate the extent of the joints, including the haunch and the lower edge shoulder.

– The lines to indicate the width of the 10mm mortise at the top of each leg should be marked ideally with a mortise gauge. Alternatively, a simple marking gauge can be used but will require resetting on the wider (50mm) face of the legs.



With the rails, you need only mark out the end of one rail with lines to indicate the length of the 10mm thick tenon (known as the shoulder line) and its position centrally in the 20mm thick end of the wood. (Fig T-3).

The mortises in the top of each leg are formed using the router in its special mounting bracket on the Powershop and straight 10mm Ø cutter. (Fig T-4).

Mount the router bracket on the Powershop as instructed earlier and then clamp the router firmly in the bracket. Adjust the Powershop arm and yoke so that the cutter is directly over the gauge lines made earlier on the legs, when the leg is held against the fence in the table. Clamp the arm and yoke firmly in position and clamp a piece of timber as a stop to the fence to the right of the leg in order to limit the length of the mortise.

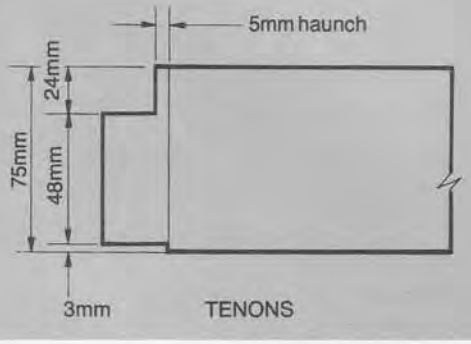
Do not attempt to cut the full depth of the mortise in one pass. By turning the Powershop elevating handle, lower the router bit 2mm below the surface level of the leg and against the end of the leg. Switch on the router and feed the leg along the fence into the router until the length-stop blocks the wood 72mm into the cut. Pull the leg back off the router bit and lower the arm one complete turn (bringing the bit down by 3mm) and make a second cut so that the mortise is now 5mm deep. For the first 24mm from the end of the leg a mortise or haunch to a depth of 5mm is all that is required. The remaining 48mm has to be cut another 20mm deep or 25mm in total, so continue as above with repeated passes cutting 2 or 3mm away in each pass.

Having used the router in this way leaves the mortise with rounded ends which need to be trimmed square with a 10mm wide chisel. Repeat the above mortising operation until the two mortises at the top of each leg are completed.

To strengthen the joints still further, screws will be driven in from the inner surfaces once assembled so holes of 4mm Ø need to be bored and countersunk.

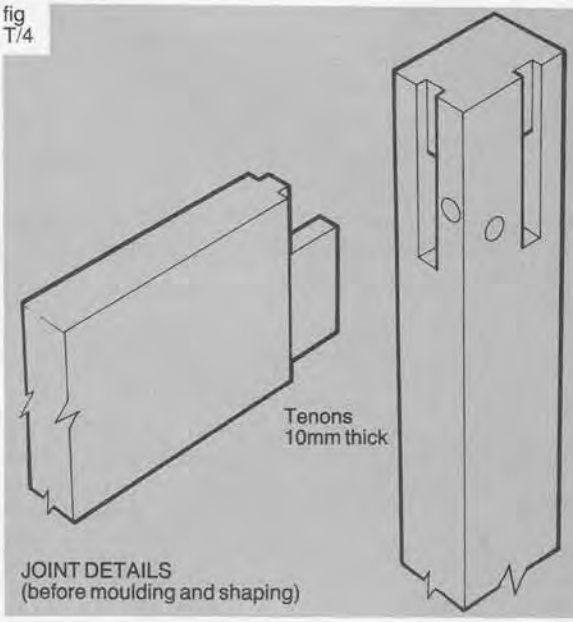
These can be made in several ways, the easiest perhaps involves the router once again with the appropriate sized straight bit mounted. Having locked the arm and yoke assembly so that the router is correctly positioned relative to the fence for the hole to be drilled, switch on the router and slowly lower the bit into the wood by turning the PowerShop elevating handle until the bit enters the mortise cavity below. Repeat until similar holes have been drilled into each mortise cavity in the legs.

fig T/3



TENONS

fig T/4



JOINT DETAILS
(before moulding and shaping)

Alternatively, making use of the powershop once again, the optional drill chuck can be mounted to the rear of the motor with the appropriate bit fitted. The yoke is then rotated 90° so that the bit points towards the column. You will then need to fit a higher fence into the table because, with the arm at its lowest point a supplementary table will need to be placed beneath the leg workpiece to present it at the correct height for the drill bit. The supplementary fence and table can be any appropriately-dimensioned spare timber you have available. Once satisfied that the leg can be held securely in the correct position remount the sawblade guard over the other end of the motor shaft (but do not fit the sawblade). Now pull the yoke assembly forward to the front of the arm and switch on the powershop. Then

push the yoke assembly (by gripping the blade guard) towards the column and drive the bit slowly into the leg until the bit enters the mortise cavity. Repeat until all holes have been drilled in the same way.

To complete the initial work on the legs. use the taper-sawing jig previously suggested, with the yoke turned to put the blade in the in-rip position. Adjust the blade guard so that the riving knife and anti-kickback fingers are correctly positioned. Now set the taper-jig at the angle required and lock the yoke assembly on the arm so that when the end of the cut is reached you will be left with a 32mm square section in the bottom of the leg. (Fig T-4a). Once satisfied the jig and yoke are set correctly proceed as for normal in-ripping, sliding the taper jig with the leg mounted on it along the fence into the blade to complete the cut.


fig T/4 a

The tenons at each end of the rails can be formed by using either the circular saw blade or, better still, the optional Dado Head.

If you use the circular saw blade, you will need to make many repeated passes across the timber to remove the waste. If you use a Dado Head, insert the maximum number of shims or chippers depending on the type of Head used between the two outer blades, thereby minimising the number of passes necessary to cut the tenon. Then, having removed the riving knife bracket, mount the standard sawblade guard over the Dado Head.

Whichever method is used, adjust the height of the arm so that the cutter will remove the waste just down to the marker lines and clamp a stop to the fence so that the first pass runs along the line marked to limit the length of the tenon. The rail can then be slid along the fence back from the stop and repeated passes made until all waste is removed to the end of the timber. (Fig. T-3).

Having removed all the waste on one side of the rail in this way, turn it over and repeat with the other side. You then need to cut out the upper shoulder also with the sawblade or Dado Head, to a depth of 24mm and a width of 20mm. This leaves just a 5mm wide haunch to this 24mm wide part of the tenon, using repeated 3mm deep passes of the sawblade or dado head. Try the first completed tenon in one of the mortises before continuing with the rest, just to satisfy yourself that it is a good fit, adjusting the measurements as necessary.

Once you have done this, proceed to cut the remaining seven tenons in the same way, using the first as a pattern for the positioning of the stops on the fence and the depth of cut required. Leaving the stop in the same position on the fence enables all 8 tenons to be cut to exactly the same length. (Fig. T-5).

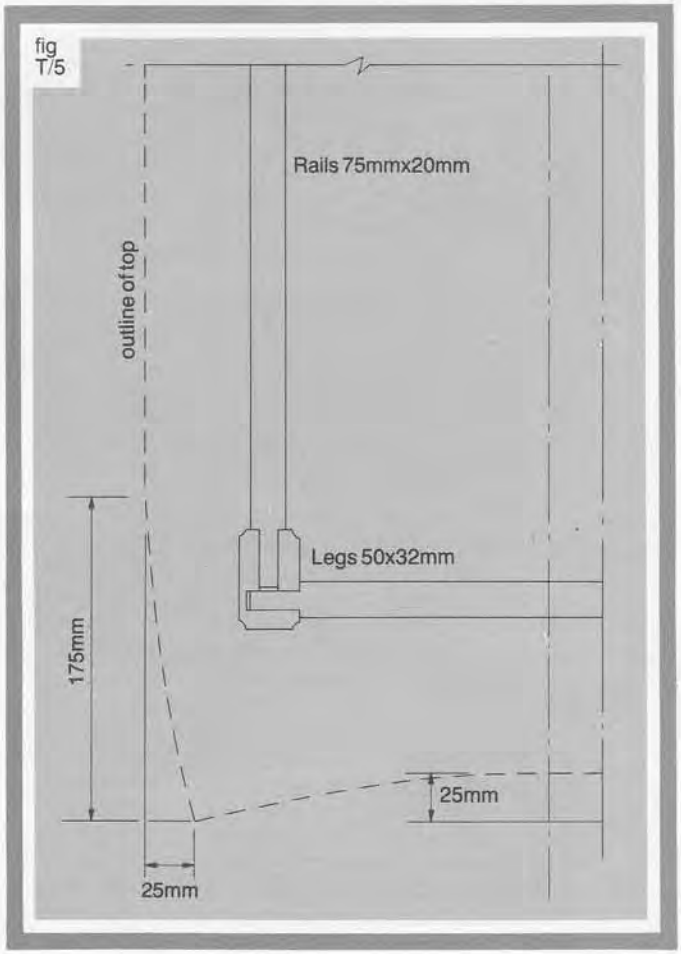


fig T/5

In the design illustrated, the lower edges of the rails feature a gentle concave curve. (Fig T-6). Use a thin lath of wood when marking out the curve. The help of an assistant to bend the lath while you make the line makes the job easier.

The optional Dewalt Sabre Saw Attachment provides an ideal way to cut these curves. Alternatively a portable jigsaw or stationary bandsaw will do the job satisfactorily. Whichever method is used, make the cut just outside the marked line so that the final smoothing of the concave edge can be perfected with the optional DeWalt Drum Sander attachment.

If you use the Sabre Saw attachment, position it so that there is plenty of room around the blade for movement of the rail to complete the curve (probably the yoke in one of the ripping positions is most appropriate). Position the shoe of the attachment to that it will just glide over the upper surface of the rail as the cut proceeds. Do not try to force the material into the blade too quickly or you risk either breaking the blade or producing an inaccurate cut.

When you have cut the curves on all 4 rails, mount the Drum Sander onto the motor shaft and tilt the motor 90° into the vertical position. Remove the rear table boards from the Powershop and lower the sander so that the lower end is just behind and below the level of the fixed table. Feed the timber carefully following the line at a uniform speed against the rotation of the sander. Make sure you keep the timber moving, otherwise dwelling on one spot will tend to produce irregular indentations on the curve.

The decorative edges to the rails and legs are made with a small coving cutter in the router. Since coving cutters do not have a 'pilot' to guide them, you need to secure a 'follower' to the table* surface. With the cutter and follower correctly set in relation to each other forming the decorative edge is simply a matter of feeding the work past the edge of the follower. Remember to feed the timber against the direction of rotation i.e. from left to right.

Forming the decorative edge on the legs will require the arm to be positioned higher than for the rails because of the thicker material. It is also preferable to 'stop' the cut on the inner corner a little above the lower end of the mortise, so that the coving is kept clear of the screw holes.

**You may find it necessary to add a false table to the standard work surface, in order to raise the work sufficiently – even with the arm adjusted to its lowest level.*


fig T/6

With the basic work of the underframing completed, all surfaces must be well smoothed before applying the finish later. This is known as the cleaning-up stage, and full use can be made of the Drum Sander attachment. The coved edges will need to be sanded by hand. It is a good idea to use a piece of wood as backing to the sandpaper, shaped in the reverse profile of the cove.

As part of the preparation for the final assembly the waste at the lower end of the legs can now be sawn off, but any waste at the top of the legs should be left until later.

Assembly is always best if done in stages, so it will be as well to put together the underframe now before the actual table top is prepared.

First of all assemble the legs and short rails together, using a general purpose woodworking adhesive applied to both the mortise and the tenon in each case, with the work held tight together with ideally a sash cramp while the adhesive is drying.

It is, of course, essential to check that the assembly is square and that the legs are parallel and not twisted. Remove any surplus glue before it dries. Once satisfied with the appearance, a screw can be secured through each joint.

Having allowed the glue to dry, the two sub-assemblies can now be joined with the long rails using the above procedures.

The underframing is completed when any waste at the top of the legs is sawn off with a hand saw, while holding each leg in a Workmate or vice. The waste has been left on until this stage to reduce the risk of tight tenons splitting the wood (the sawn off waste wood being known as the 'joggle').

To prepare the table top, proceed as follows: Three pieces of wood initially around 150mm wide, to bring down to a finished width of about 143mm, are required. These three strips are joined together with dowels to strengthen them.

The mating edges must first be planed perfectly square and then the centres for the dowel holes marked out, so that those on one edge correspond exactly with those on the other edge forming the joint.

The best method to use for drilling the holes is by way of a straight 8mm bit in the router mounted onto the Powershop, as described earlier. You will need to replace the standard fence with a higher one of your own against which to hold the wood (alternatively a good solid piece of timber can be clamped to the table against the standard fence and the table-top piece held against that).

The centre mark for each dowel hole is then positioned under the router bit and the Powershop elevating handle wound down with the router switched on to drill the holes 25mm deep.

Alternatively, lay the table section flat on a supplementary table against the fence and then turn the motor, with the router mounted, through 90° so that the router bit points horizontally towards the column and then drill each hole by moving the yoke assembly along the arm (pushing the control handle sideways effectively).

To enable effective use of adhesive to strengthen the dowel joints, the dowelling must be grooved along its length by passing it beneath the Powershop's blade in its in-rip position (as described earlier in the book).

Then, still using the 'V' grooved jig, the dowelling needs to be cross-cut into lengths of about 50mm, and then one end should be pointed slightly with sandpaper to make it easier to mate the two parts together.

The three table top sections are then glued together and held tight with clamps. Once dry, one edge of the top is planed straight and then it is rip-cut to the required length.

Now the curved shape is marked in pencil on the upper surface in accordance with the drawing (T-5) and the Sabre saw attachment (jigsaw, or bandsaw) used to cut the outline just outside the marked line.

The sawn edges can then be sanded with the Drum Sander attachment before proceeding with the moulding of the edges.

This shaping job (T-7) was done with an ogee cutter mounted in the Router and as it had a pilot, the "follower" used earlier on the table was unnecessary. It is advisable to form this profile in a series of passes to minimise the tendency for tear-out of the grain and hence give a cleaner cut. As described earlier in the book, it is better to make the endgrain cuts first as this reduces the risk of possible slight splintering at the corners.


fig T/7

Special care is needed when cleaning up the top of the table. Using the Disc Sander attachment on furniture-type projects is not recommended because the width of the surface exceeds the diameter of the disc and would therefore tend to leave circular score marks. An orbital or belt sander provides the ideal way of smoothing the top, while the moulded edges will have to be done manually as on the legs and rails.

A little extra time spent on sanding the top will be well worth while to produce the best finish. Use metal shrinkage plates to secure the top in place. (T-8). Screw them first to the side rails (T-9) and, when securing the top to the plates, use only the slots which are at right angles to the grain. (T-10). This is so that the plates can function properly and allow the top to 'move' slightly depending on how dry or otherwise its surroundings are.

Various finishes can be used to complete the job. The original was given 2 coats of polyurethane gloss varnish, each coat being "flatted down" with fine abrasive paper when quite dry. Then a final coat of eggshell varnish was applied to finish it off.

fig T/10

fig T/8

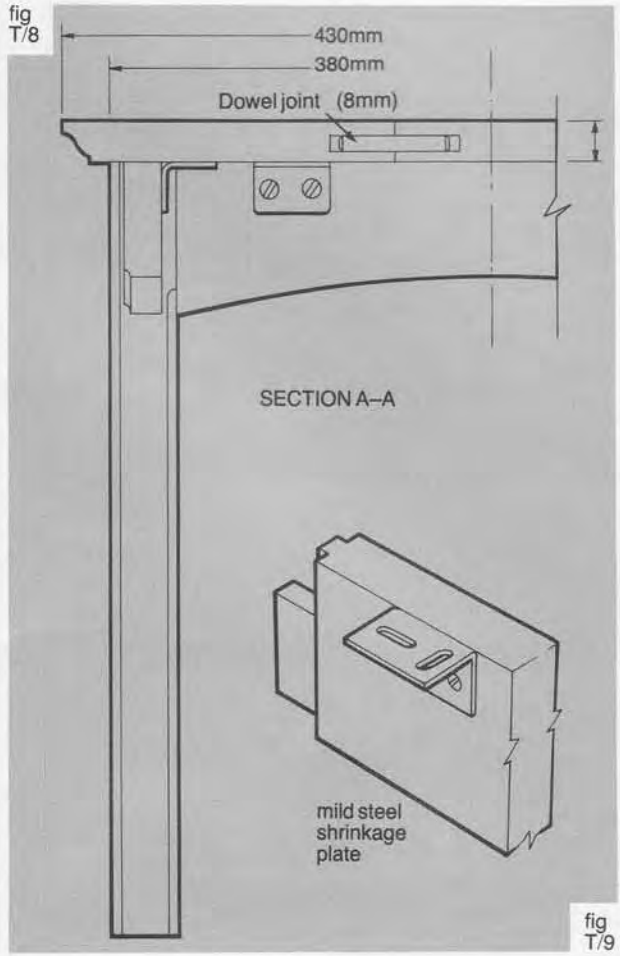


fig T/9

Stepladder

The height of these steps makes the ladder ideal for domestic use. It has a platform top which automatically locates as the steps are opened up or folded and it features a pair of standard stepladder hinges available from most hardware stores and builders' merchants. Two metal tie-rods are included for added strength, but they are not essential.

fig S/1

Materials Used:

Timber for steps should be chosen with care, quality in terms of straightness of grain and freedom from knots being more important than species.

Red Deal, Parana Pine and Columbian Pine are all suitable soft woods, while Ramin is a good choice of hardwood.

Additional materials:

- 9mm Plywood for platform
- Pair of stepladder hinges
- 6mm Ø mild steel rod and 4 washers
- 6mm wood screws of various lengths and matching cup washers.

Widths and thicknesses are NET, an allowance has been added to the lengths.

Cutting List:

No.	Description	Length	Width	Thickness (mm)
2	Stiles	1755	75	22
1	Tread	480	100	22
1	Tread	455	100	22
1	Tread	430	100	22
1	Tread	405	100	22
1	Tread	480	100	22
2	Legs	1510	48	22
1	Top Rail	405	57	22
1	Lower Rail	510	57	22
1	Diagonal	1040	57	16
1	Spindle	385	32	32
1	Platform top plywood	355	280	9
1	Rear member to platform	305	40	20

Equipment Used:

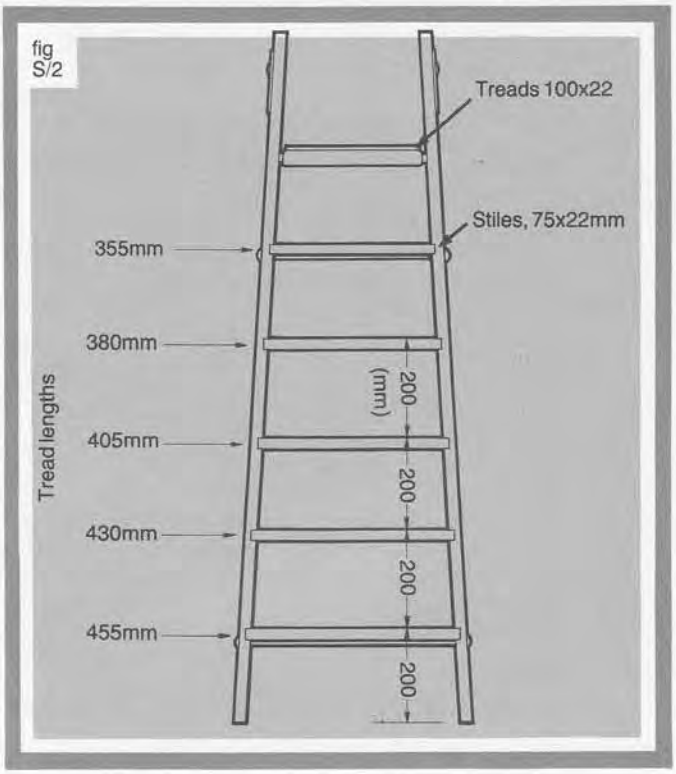
1. DeWalt Powershop DW320 or DW125 together with the following optional attachments: Dado Head, Disc Sander, Drum Sander, Special Mitre fences.
2. Portable electric drill.
3. Handtools: Sliding Bevel, hammer or mallett, Hacksaw, handsaw, chisel, screwdriver.

Preparation Of The Components

The first stage is to crosscut the stiles and treads. The material for the original steps was bought in widths of 150mm and so needed ripping first of all to the widths shown in the drawings.

If your Powershop is equipped with a TCT blade only the smallest amount of excess timber beyond the finished dimensions need be allowed for smoothing. Remember to set the riving-knife and anti-kickback device properly before ripping.

A sliding bevel set to 60° is used to mark out the trenches for the treads in the stiles. The stiles must be marked out as a pair and the 200mm spacing between treads marked as a vertical dimension (Fig S-2). Trenches, or dados, are usually made to a depth of around one-third the thickness of the material – in this case say 7mm. It is unnecessary to mark this depth in more than one trench position since, once the Powershop is correctly set for that depth, all the other trenches can be cut to exactly the same depth. The ends of the stiles are also marked using the sliding bevel.



The radial arm must be set to 60° right to mitre cut the waste off the ends of the stiles.(Fig. S/3)

The trenches or dados can be cut either with the circular or saw blade, making as many passes as are necessary to cut the 22mm of waste away, or with the optional Dado Head. Even with the latter two passes will need to be made to gain the width required and because of this the width setting of the Dado Head is not critical as long as it is greater than half the 22mm needed, otherwise more than 2 passes will have to be made. Whichever method you use, first cut against the two lines marking each extreme of the trench and then remove the waste left between them if any.

One stile can have these trenches cut without altering the setting of the arm (as was used for cutting the ends off the stiles). The other stile will require the arm to swing 60° to the left of centre – again check the angle with a trial cut before committing yourself to the prepared stile.

With cuts of this type it is as well to check you have exactly the correct angle by making a trial cut on a piece of scrap timber. Even though the stiles are marked out as a pair, the ends can be sawn at one setting of the arm provided the marking out is completed on both sides.

Bore a 25mm Ø hole at the upper end of each stile for the platform spindle, using a flat bit mounted in the optional drill chuck attachment. The hole should be centred in the stile 200mm above the top fixed tread. Remove the guard and sawblade and then replace the guard. With the drill bit pointing towards the column, hold the stile against the fence and adjust the height of the arm so that the bit lines up with the marked centre (using supplementary table and fence as necessary). Then switch on the Powershop and ease the drill bit into the stile until the hole is complete.

The two 6mm holes can now be drilled into each of the tread trenches using a standard morse bit in the drill chuck attachment and proceeding as above.

A hardwood is preferred for the platform spindle. (Fig S-4). The pins at each end of the spindle are initially prepared as square-sectioned using ideally the optional Dado Head or the standard sawblade making more passes. First of all, trace a 22mm Ø circle on each end of the spindle and mark a line 22mm in from each end across all 4 faces indicating the width of the pins. Clamp a stop to the fence also to give easy control on the extent of the pin.

fig S/3

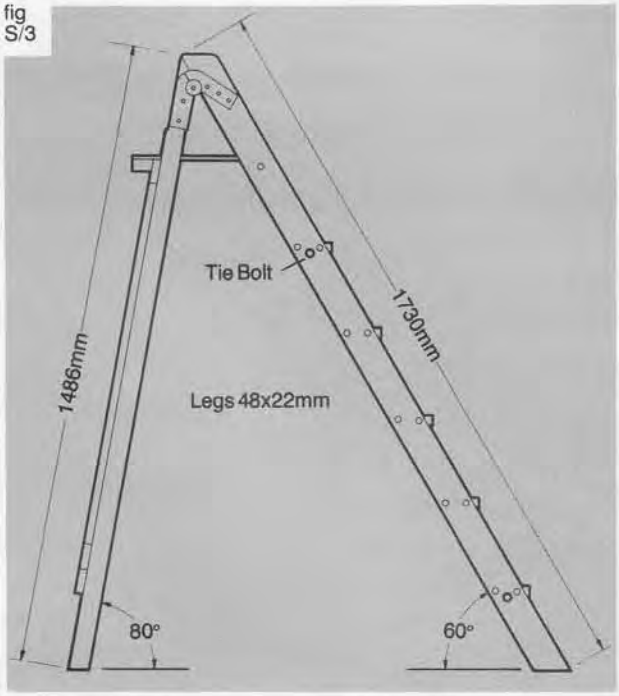
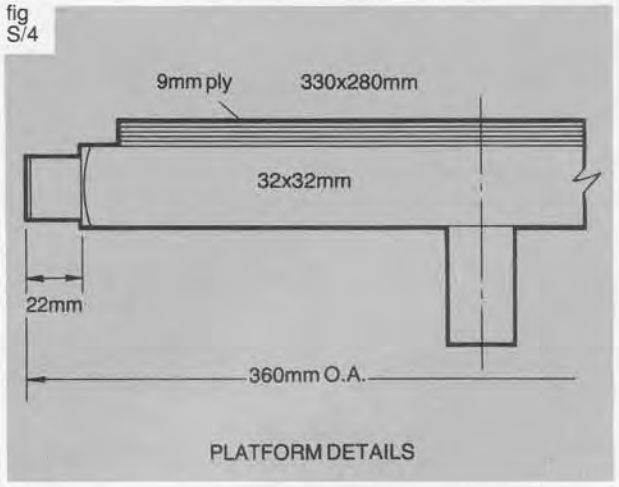


fig S/4



PLATFORM DETAILS

The squared pins can be quickly converted to the 22mm Ø cylindrical shape using a hack saw, chisel and finally a file. The pins need to be a comfortable fit in the holes at the top of the stiles. Carefully take the corners off the spindle adjacent to the end-pins with a chisel to allow easy movement of the spindle.

When the treads are cut to their 100mm standard width this is done with the sawblade in the 60° bevel-rip position to provide a bevel on the rear edge and make them flush with the rear edge of the stiles. Before starting to cut make sure the riving knife is in the correct position and angle the anti-kickback fingers so that both sets are in contact at the correct angle with the wood. Remember to use a push-stick when ripping to keep your fingers well clear of the blade.

The treads must then be bevel cross cut to the individual lengths shown on the drawing. (Fig S-2). The bevel angle is only 3° on the scale to permit the stiles to adopt the 87° angle shown and ensure good surface to surface contact of the treads within the stile trenches. Take care to cut the bevel angle the right way up relative to the bevel made previously on the rear lower edge of the treads.

Having cut the 3° bevel on one end of the tread simply turn it round so that the other edge is against the fence (same side up) and make the second bevel.

The amount of "cleaning-up" and sanding which a stepladder justifies is really up to the individual but, in preparation for assembly, the top front corners of the stiles should be rounded over. The optional Disc Sander is ideal for smoothing the faces of the material, while the optional Drum Sander attachment will tidy up the edges including the bevel edges perfectly satisfactorily.

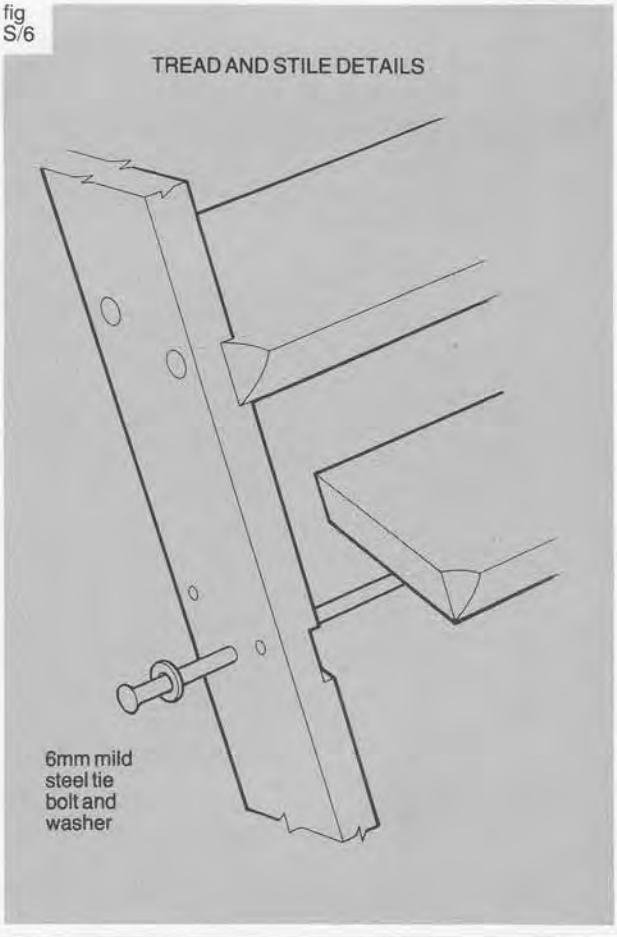
The steps are assembled without adhesive, a hammer or mallet being used to help in this. Never use a hammer directly onto the work – always insert scrap wood between for protection. Remember to put the platform spindle in position along with the treads before securing to the stiles. Sash Clamps are also useful at this stage to hold the steps together while they are secured.

Using an ordinary portable drill, bore pilot holes through the existing holes in the stiles and into the tread before inserting the screws. The use of screw caps is preferable to countersinking. (Fig S-5). Once secured in position the projecting front corners of the treads are carefully cut by chisel to form a neater finish against the stiles.

fig S/5

fig S/6

TREAD AND STILE DETAILS



Ordinary mild steel of 6mm Ø is recommended for the tie rods (if fitted – Fig S-6) and the holes for these are bored immediately below the top and bottom treads. (Fig S-7). Use a hammer to burr over one end of the rod and place a washer on it before inserting it through the first stile. Push the rod through the second stile until the washer and the burr at the other end stops it and cut the rod with a hack-saw so that approximately 2mm extends beyond the washer placed at this end. You can now burr over the second end of the tie rod to prevent any further lateral movement of it.

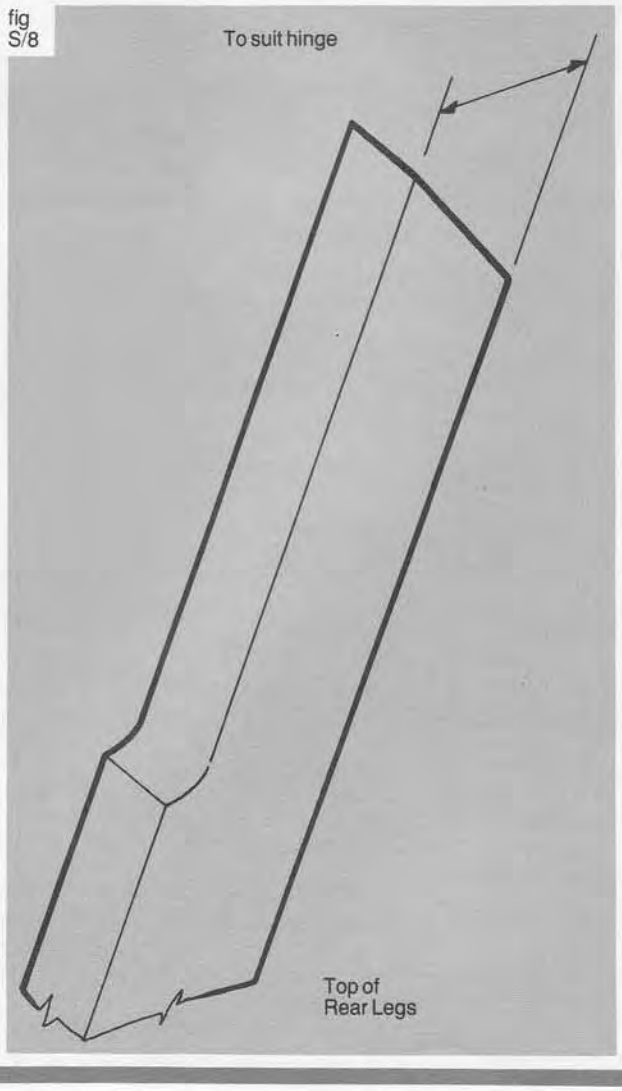
The angle required at the top of the rear legs is 50° and it is for angles greater than 45° that the Optional Special Mitre Fences prove so useful.

The lower end of the legs can be cut using the above fences or by moving the arm 10° off-centre.

The tops of the legs need to be trimmed a little narrower in order to accept the hinges, (Fig S-8) an operation carried out best with a bandsaw or a jigsaw but also possible with an ordinary hand saw. Small cramps or 'G' clamps will he useful to hold the hinges in place on the stile and leg while pilot holes are drilled and the screws secured.

fig S/7

fig S/8



The length of the two cross rails tying the legs together is best determined directly from the work (Fig S-9) and, when cut to length, the ends should be mitre cut to 87°, i.e. the Powershop arm needs to be set 3° off-centre. The same angle is used to form the 6mm deep rebate, having started at the line.

The top edge of the upper rail should be bevelled 10° to accept the platform resting on it squarely. Due to the size of the timber, this bevel is best prepared by passing it several times against the rotation of the optional Drum Sander attachment, set at 10° on the bevel scale (bevel ripping this strip to obtain the 10° angle is not recommended unless it is being cut from a wide board). The strip for the underside rear of the platform features the same bevel angle and can therefore be done at the same time.

Screws with cup washers are again used to secure the rails in place. (Fig S-10). Remember to drill pilot holes first to prevent the wood from splitting.

The long diagonal brace to the legs is not rebated at its ends and has a standard thickness of 16mm. Thus the rear surfaces of the legs and the brace are flush.

Recognising the fact that it is difficult to predetermine the precise angles which will be required, it is probably best to make the angle cuts at the ends of the brace after presenting it to the leg assembly and marking it accordingly.

If you have the optional mitre fences available, it will be relatively easy to adjust them to line up with the Powershop's blade path and make the cuts. Otherwise you may find it as well to use a hand saw.

fig S/10

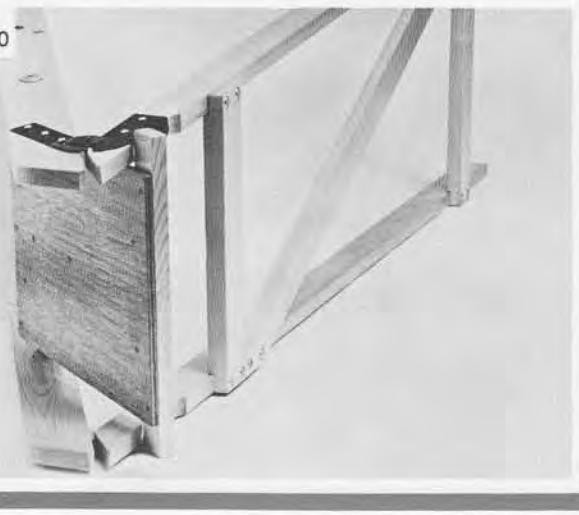
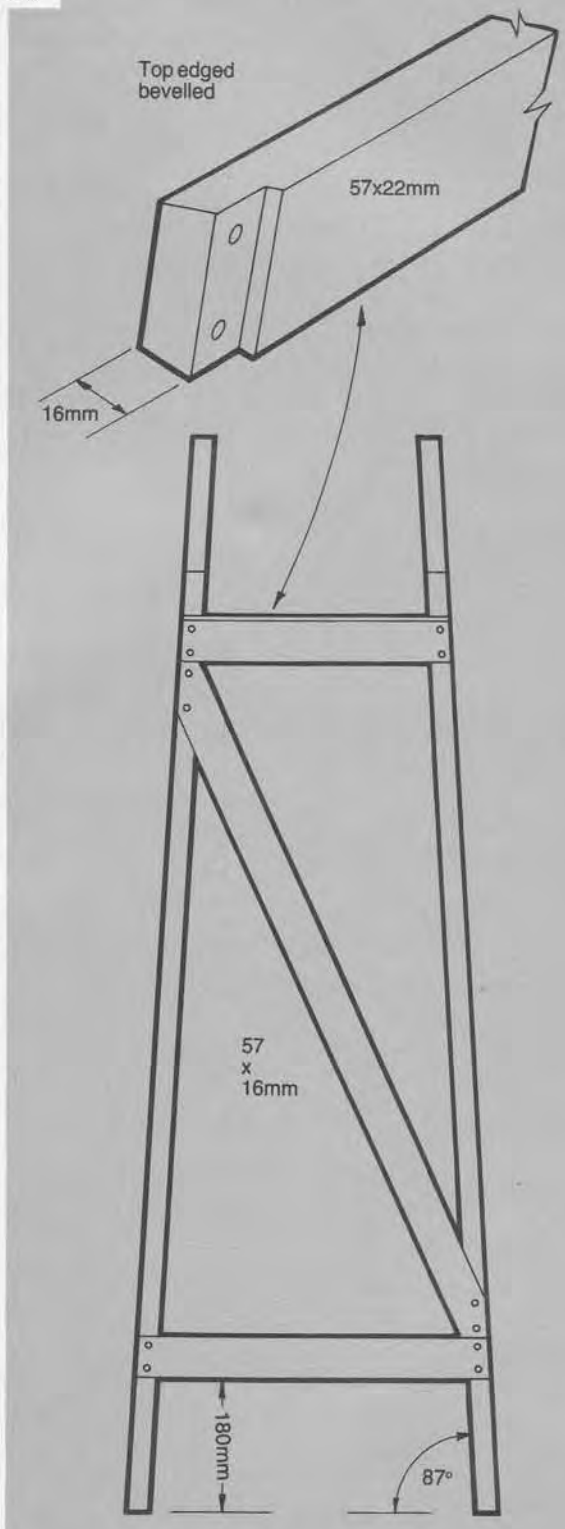


fig S/9



The platform can now be assembled onto the spindle already located in the top of the stiles (Fig S-11). The plywood should be "exterior grade" and cut to the sizes given. The strip for the underside of the rear of the platform, bevelled earlier, should now be cut to length and secured to the platform as shown.

Now cut the shaped block to size making the mitre cuts as specified. The gap between the narrow tapered end of the block and the strip on the rear underside of the platform should be about 30mm to allow the top cross rail on the legs to locate easily between them (Fig S-12). Assembly of the platform elements using woodscrews completes the actual construction of the stepladder.

The whole structure can now be given a couple of coats of varnish, if required. This helps to keep them looking clean and smart, and prevents them from absorbing water if used outside.

fig S/11

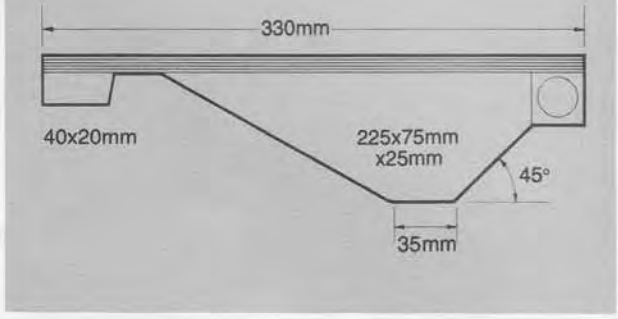
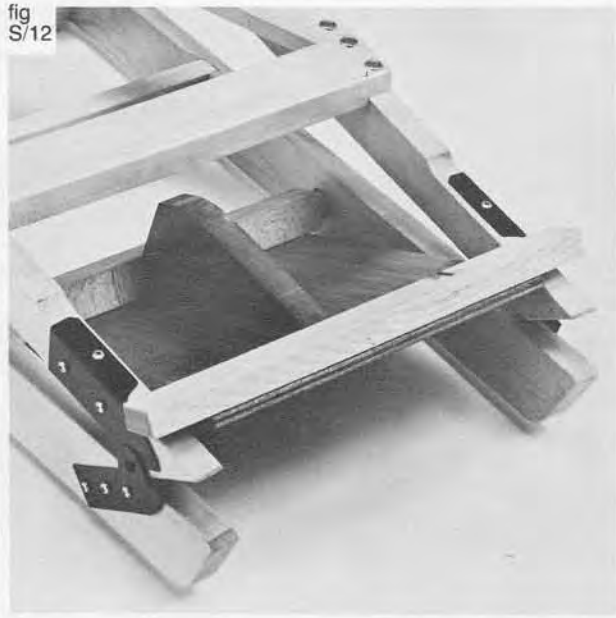


fig S/12



Pages 125 and 126 were for the user mailing list registration form.

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Alphabetical Index

ALPHABETICAL INDEX

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DEWALT POWERSHOP

HANDBOOK

AN INVALUABLE AID

If you already own a DeWalt Powershop, this handbook will provide an invaluable aid in maximising the versatility of your precision woodworking machine.

QUESTIONS AND ANSWERS

Similarly, if you are still considering whether to buy one, this handbook will answer all your questions, clearly showing the way in which a DeWalt Radial Arm Saw can bring greater precision, simplicity and versatility to your woodworking projects.

COMPREHENSIVE INFORMATION – EASY TO FOLLOW

Although it relates specifically to the DeWalt DW320 and DW125 Powershop models, the principles detailed in this handbook will be equally valid to users of the larger DeWalt machines.

The handbook gives comprehensive information on both the basic machine and its use with the wide range of attachments available for it. Safety, sawblades, materials, maintenance and adjustment procedures and also two interesting and useful woodworking projects are further items covered in this easy-to-follow reference book.

Since the DeWalt range of Powershop Radial Arm Saws is continually being developed and improved, some of the finer details of the handbook will inevitably become out of date.

Information on new Powershop models and other DeWalt woodworking machines can be obtained from the addresses inside the back cover.

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