Workbook

Use and maintain hand tools for furniture making

Unit Standard	2199
Level	2
Credits	4
Version	4

Name:

Competenz

My learning journey

My Goals

I aim to have this unit finished by

The certificate I'm working towards is

Important dates

My account manager is

Phone

My trainer/assessor is

Phone

Welcome

Kia ora

This guide covers the unit standard 2199: Use and maintain hand tools for furniture making.

It also contains exercises and activities to help you learn the material and prepare for your assessment.

What's in it for you?

After completing this workbook, you'll become familiar with the correct techniques when handling tools for furniture making.

You'll learn about:

- Hammers and mallets
- Chisels and hand saws
- Measuring tools
- Squares and sliding bevels
- Sharpening equipment
- Sanding blocks
- Cramps and gauges

What's in your workbook

Let’s get you started by looking at what’s in this book, and some tips on how to use it.

Stuff to help you learn

This workbook is full of information, pictures and diagrams showing you what you need to know. You’re in control of your learning and you can do it at your own pace.

Lots of activities

These will help you learn and prepare you for your assessment.

Have a think

Go find out

Have a go

Look out for these icons too

Find out more

Safety alert

Contents

Start at the beginning and work your way through, or go through the book in the order that suits you.

01 Hammers and mallets

What you'll learn

This section covers the different types of hammers and mallets used for furniture making.

You'll be shown:

» How to hold a hammer correctly

» What defects you'll need to check for in your hammer

» How to take good care of your hammer and mallet.

Hammers

Hammers are used to drive nails, staples, and other fixings into timber or composite material. There is a range of hammers available, and each has a different function. Some have steel handles and others have wooden handles. The most common hammer you'll come across is the claw hammer. Claw hammers come in different weights ranging from 16 oz to 24 oz. Most furniture makers use a 20 oz hammer, but you should choose a weight that you feel comfortable with.

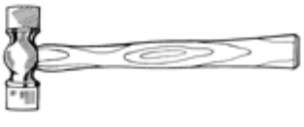
Hammers and other striking tools are widely used and often abused. Hammers are made for specific purposes in various types and sizes, and with striking surfaces of varying hardness. For example, hammers are used for general carpentry, framing, nail pulling, cabinet making, assembling furniture, upholstering, finishing, riveting, bending or shaping metal, striking masonry drill and steel chisels, and so on.

Have a think

» Do you know what the correct techniques for holding a hammer are?

“Taking good care of your hammer and mallet is just as important as knowing how to use your tools.”

Types of hammers

Common nail hammer with curved claw		Used for general carpentry work and nail pulling.
Rip hammer with straight claw		Used for general and heavy carpentry work, framing, ripping.
Finishing hammer		Used for cabinet making, finishing, general carpentry.
Cross pein hammer		General purpose hammer. Wedge shaped pein used to start small nails held between finger and thumb.
Soft–face hammer		For assembling furniture and wood projects, setting dowels, and any task which requires non-marking blows.
Tack hammer		Used to drive small nails, furniture upholstering and more.

The parts of the hammer

Using the hammer

1 If you are working with hard wood, drill a pilot hole in the material to prevent splitting.

2 To begin hammering, grip the hammer firmly in the middle of the handle – shake hands with your hammer!

3 Don't hold the hammer too tightly.

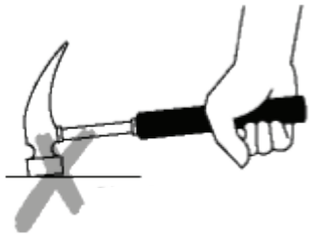
4 Hold the nail between the thumb and forefinger of the other hand and place the nail where it is to be driven.

5 Using the centre of the hammer face, drive the nail in with firm, smooth blows.

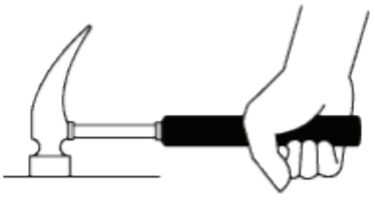
6 The striking face should always be parallel with the surface that's being hit.

7 Avoid side ways or glancing blows.

8 Take care not to mark the work surface.



Glacing blow



Square blow

“Check your hammer for defects such as chips in the head, or cracks in a hammer with a wooden handle. Don’t use a hammer with a cracked handle, or a chipped head.”

Mallets

Wooden mallet

Has a wooden head and handle, and is mainly used for striking chisels or knocking frames together.

Rubber mallet

Has a rubber head and a steel or wooden handle. It is used mainly for assembly of carcasses. Because it has a rubber head, you don't need to hold a block of scrap timber on the work when using this mallet.

Care and maintenance for hammers and mallets

Keep the handles of hammers and mallets clean and free of glue, which soils your hands and your work. Clean handles with warm water.

Before nailing, check to see that the face of your hammer is clean. Glue or other material may cause it to slip off the nail and damage your work. Bruises are often difficult and time consuming to remove. Clean the hammer face by rubbing it with a piece of old sandpaper. Place the sandpaper flat on the bench, and rub the face of the hammer over it two or three times. Ask your trainer to show you how to do this.

Never strike the work with the hammer or the wooden mallet directly. Place a piece of clean timber to accept the blows, and protect your job.

Have a go

Name the hammer

» Match the picture to the correct name. Complete without using your notes. One has already been done for you.

1		Rip
2		Soft-face
3		Common nail hammer
4		Tack
5		Cross Pein

Answers:
1 – Common nail hammer, 2 – Cross Pein, 3 – Soft-face, 4 – Rip, 5 – Tack

Notes

02 Planes and spokeshaves

What you'll learn

Planes are used to take a thin shaving of material off and create smooth surfaces for furniture.

This section describes the different types of planes used in furniture making and how you can improve a planed finish.

Types of planes

There are a number of different kinds of planes available, but all basically perform the same function. They are used to take a thin shaving of material off and make a surface smooth.

Smoothing plane

A smoothing plane is used for finishing work like flushing off joints. It has a relatively short sole, and should not be used for planing long lengths. The short sole will not remove high spots, but rather will tend to follow the shape of the surface.

Metal smoothing plane

Wooden smoothing plane

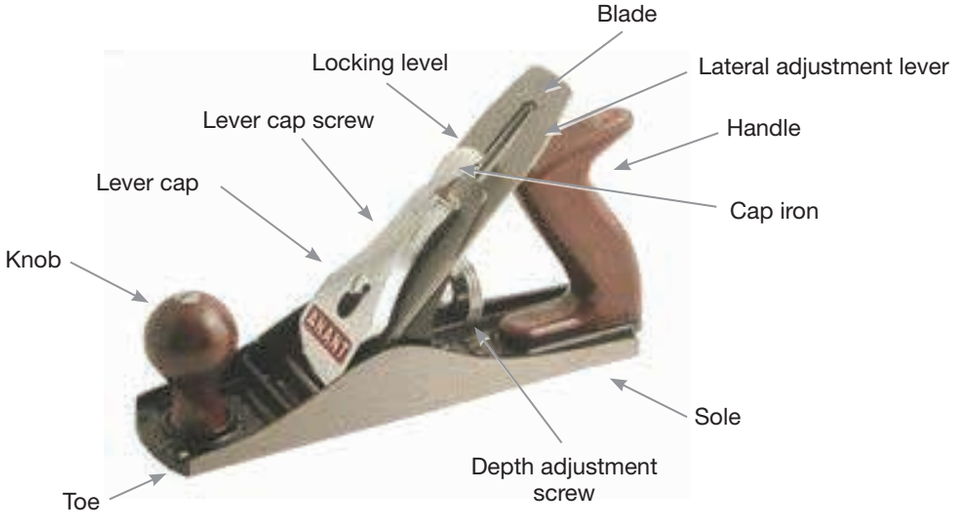
Jack plane

A jack plane is used for general hand work. It has a long sole, 350mm to 380mm, and can be used to plane long surfaces. The long sole allows you to take off the high spots, and create a straight flat surface.

Metal try plane

The try or jointer plane is made with a sole up to 600mm long, enabling it to bridge minor undulations on the surface of the work. Ideal tool for planing long straight butt joints.

The parts of a plane



In many larger workshops, the hand plane has been replaced by the electric hand planer.

Find out more

Collins Complete Woodworkers Manual Pg 118–119

Have a think

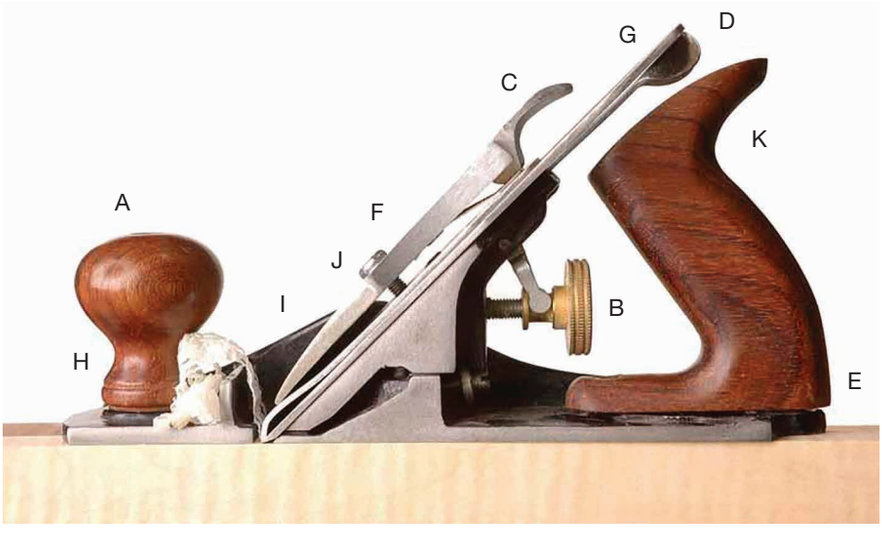
» Can you tell the difference between a spokeshave and a smoothing plane?

» Make a list of all the differences. Check your list after reading the upcoming section on spokeshaves.

Have a go

Parts of a plane

» Identify each part of the plane without referring to your notes.



A	
B	
C	
D	
E	
F	
G	
H	
I	
J	
K	

Answers: A – Knob, B – Depth adjustment screw, C – Locking lever, D – Lateral adjustment lever, E – Sole, F – Lever cap screw, G – Blade, H – Toe, I – Cap iron, J – Lever cap, K – Handle

Spokeshave

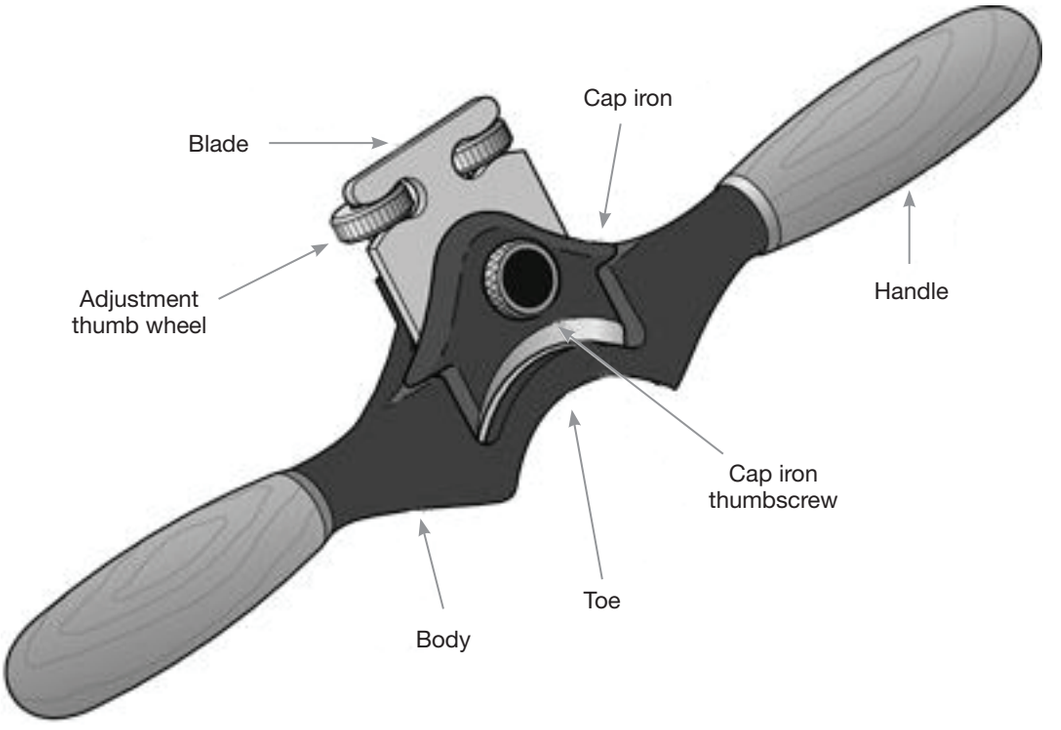
A spokeshave is a very short plane, oriented horizontally, with a handle on each side. The body of the tool can be made of metal or wood. It was originally designed for making wooden spokes for wagon and carriage wheels. It is now commonly used to make any irregular object that needs to be rounded, for example, a walking stick.

A spokeshave is used for planing surfaces on internal or external curves. The cutting action of a spokeshave is similar to that of a plane, but the sole of the spokeshave is short so it will follow the curve in a component.

Using a spokeshave

Always push a spokeshave in the direction of the grain. You usually hold it at right angles to the work but for difficult grain, hold one handle a little forward to produce a slicing cut.

The parts of a spokeshave



Care and maintenance of planes and spokeshaves

Rub metal planes and spokeshaves occasionally with an oily rag to prevent rust. You will find that they soon take on a surface coating or film, that stops general rusting.

At regular intervals, put a drop of machine oil on the thread of the adjusting screw.

Don’t drop your plane because the cast iron body may break. Avoid bumping it because this may upset the adjustment of the blade. Always withdraw the blade when you have finished using a plane and store a plane lying on its side. This practice makes sure that neither the blade nor the sole get damaged.

Always make sure the blade is sharp before you use either a plane or spokeshave. Grinding and sharpening is covered later in the training module.

Wax lubrication

Many furniture makers use wax to lubricate the plane sole. You can use candles, or petroleum wax to do this job. Don't apply too much wax, especially on open-pored timbers where wax may be trapped in the grain. Wax left on the surface of components stops stains and lacquers from drying.

Scrapers

A cabinet scraper is used to improve a planed finish by removing the slight hollows and plane marks. When sharpened correctly, it produces very fine shavings, and improves the quality of the finished surfaces that you send to the polisher.

Using a scraper

Push method

Hold your scraper in two hands, with your thumbs behind the blade, near the cutting edge. As you move the scraper forward, bend it slightly. This stops the corners digging in to the timber and producing gouges.

Use the scraper along the grain. Using it across the grain can produce torn grain, and create extra cleaning up work for you.

This is the most aggressive method of scraping. A bow is formed in the scraper by pushing the centre out with your thumbs, and the scraper is pushed into the wood. This is the most popular approach, as it gives the fastest results.

Pull method

While not as aggressive as the push method, the pull method gives the user more control. Use the pull method when doing detail work, focusing on a specific area or difficult grain.

Handle your scraper carefully so as you don't damage the cutting edge. When you put it down, use a piece of scrap timber, and hang the cutting edge over the edge of the timber.

Sharpening a scraper

Cabinet scrapers need to be sharpened correctly, or they will not produce the fine shavings. You will only get fine dust. When you are sharpening a scraper for the first time, get your trainer to help you work through the following steps:

1 Square the edge

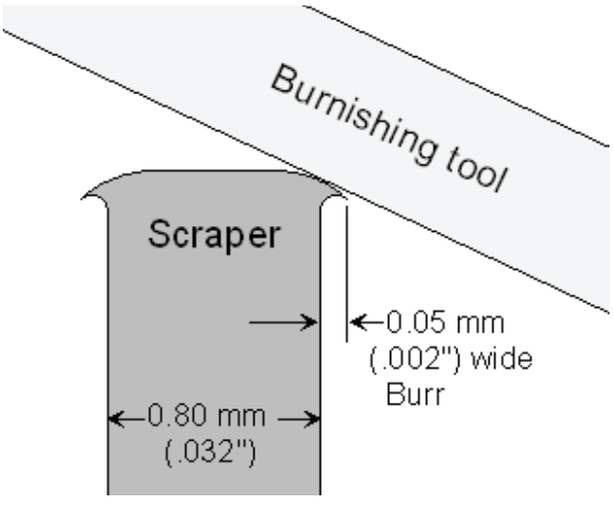
2 Remove the file marks

3 Remove the burr

4 Burnish and draw the edge

5 Turn the edge.

If your scraper only needs to have the edges “touched up” to improve the cutting action, then you need only follow steps 3 - 5 above.



Have a go

» Ask your trainer to show you a scraper that needs a complete sharpen and one that needs just a touch up.

That's the end of this section. Take a moment to think about what you've learned and make sure you're ready to move on.

» What questions do I still have for my trainer?

» What new things have I learned?

» How will I use the knowledge and skills I've gained in this section?

Move on to the next section if you are confident that you can:

» Explain the differences between a smoothing plane, a jack plane and a metal try plane.

» Explain the two different ways of using a scraper.

If not, that's OK, you could:

» Talk to your trainer

» Re-read the section

» Get more practice.

Notes

03 Chisels

What you'll learn

This section covers the different types of chisels used for furniture making and how to take proper care of your chisels.

Chisels are cutting tools and are used to do several different jobs. You can use them:

» For fine, delicate cutting, such as removing waste from dovetail joints

» For heavier chopping work such as checking in hinges, or hand cutting mortises

» To shape and trim timber.

Types of chisels

There are two main kinds of chisels — firmer chisels, and bevel edge chisels.

Firmer chisels

Bevel edge chisel

Firmer chisels

Firmer chisels are strong and suitable for heavy work where a mallet is used. It doesn't have bevels on the sides of the blade.

Bevel edge chisel

The bevel edge chisel has a bevel on each side of the blade. It is used for general cabinet work because the blade is bevelled along its length. This makes it lighter and more suitable for fine work such as trenching, grooving, and dovetailing. Its main advantage is that you can use it to cut waste material out of the corners of rebates, trenches, and dovetails.

Find out more

Collins Complete Woodworkers Manual Pg 128–131

Types of bevel edge chisels

Butt chisel

Paring chisel

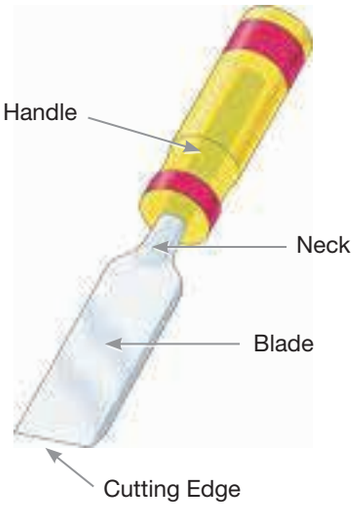
Butt chisel

One kind of bevel edge chisel is the butt chisel. It has a very short bevel edge blade. Because the blade is short, you have more control of the chisel. You can use it for light chiselling work such as checking in hinges, although you can also use it for chopping work. Because the blade is short, there is less vibration than with a longer blade when it is used for heavy work.

Paring chisel

Another kind of bevel edge chisel is the paring chisel. This has a long, thin blade with bevelled edges. The blade length can vary from 225mm to 500mm. You use the paring chisel in the direction of the grain and on the end grain of timber.

The parts of a chisel



Caring for chisels

As with all edge tools, don't drop them. Not only will you damage the cutting edge, you could cut yourself or the electric cord of a power tool.

Rub the blades occasionally with an oily rag to prevent rust. They will soon take on a surface coating or film, which stops general rusting. Always put a chisel away when you have finished with it, so that the blade won't get damaged.

Always make sure the blade is sharp before you use a chisel. Grinding and sharpening is covered later in the training module.

Go find out

Ask your trainer to show you how to use each kind of chisel.

Make sure to cover these chisels:

» Firmer chisel

» Bevel edge chisel

» Butt chisel

» Paring chisel.

Also ask them about best practices for working safely with chisels.

04 Measuring tools

What you'll learn

There are a number of measuring tools commonly used by furniture makers. They include the folding rule, steel rule, tape measure, and vernier callipers.

Types of measuring tools

Folding rule

The four-fold one-metre rule is made from boxwood or plastic and is hinged at 250mm intervals. It is marked off in millimetres and every tenth millimetre (each centimetre) is numbered.

Tapes

You use tapes mainly to measure long lengths of timber or board materials and to measure around curves or corners, but you can also use them for shorter lengths. They can also be used for measuring internal sizes, because of a self-adjusting part on the end.

The full length of tapes varies from two to seven metres. They are spring loaded and fully retractable. Many furniture makers use a five metre tape because it is long enough for most measurements they're likely to make.

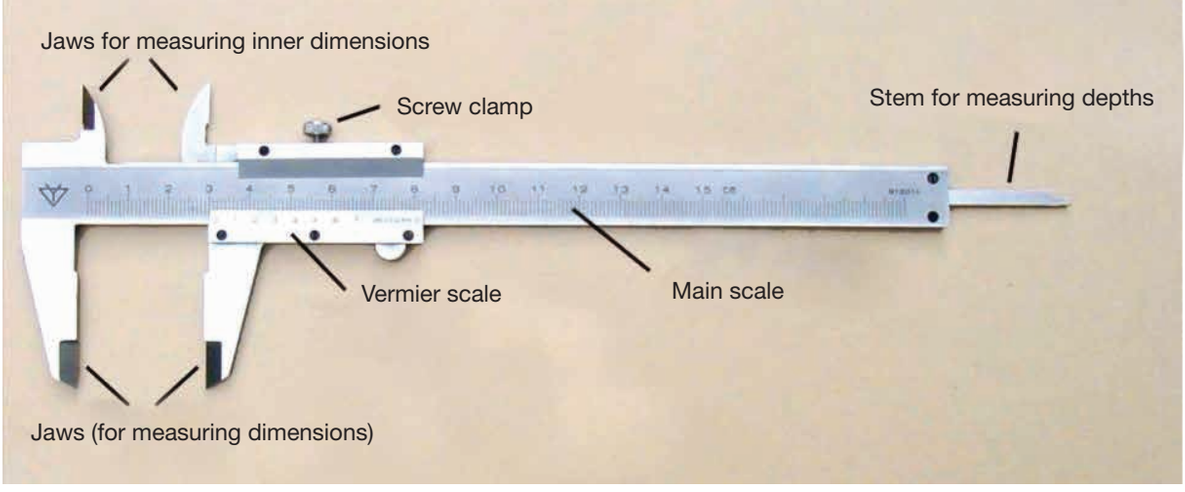
Because tapes are thinner than the folding rule, it is easier to get an accurate measurement. You still need to use a sharp pencil, or a pen for marking.

“For accurate measuring, hold the rule on its edge with the division marks to the timber. To ensure you get an accurate measurement, place the folding rule on edge and mark off your measurement with a sharp pencil.”

Steel rule		These are mainly used for accurate measuring when a machinist is machining rebates. Steel rules are made of light steel and are marked out in the same way as folding rules and tapes.
Vernier callipers		These are designed for making small accurate measurements, and are used more by staff in the machine shop than by assembly staff. They are calibrated to an accuracy of 0.1mm, and so machinists often use them to get accurate measurements where machining tolerances are critical, for example, to check the diameter of router cutters.

The parts of vernier callipers

It is very important that vernier callipers are not banged in any way, because this upsets the accuracy.



Have a think

» Think of some common household items of furniture. What measuring tools would you use to measure these items of furniture? Choose from the tools covered in this section.

Notes

05 Hand saws

What you'll learn

Hand saws vary in size and shape to suit particular jobs. In this section, you'll learn about the three main groups of handsaws:

» Rip, crosscut and panel saws

» Backed saws, such as tenon saws and dovetail saws

» Curve-cutting saws.

Measuring pitch in hand saws

Pitch is a measurement of the number of teeth that a saw has, using the units **teeth per inch (TPI)** or **points per inch (PPI)**.

To know the difference between these measurements, imagine each saw tooth as a mountain.

» **TPI** counts each whole mountain (saw tooth), from the left face to the peak then down to the right face.

» **PPI** counts only the points of the teeth, or the 'peak' of each mountain.

TPI and PPI are very different measurements, so make sure you understand which one is being used.

Common types of hand saws

Rip saw

The rip saw is the largest of the handsaws, with a 650mm blade designed for cutting solid timber in the direction of the grain. Rip saw blades are made with 5 or 6 points per inch (PPI).

Crosscut saw

The crosscut saw is ideal for cutting solid planks or balks of timber to length, but it is rather coarse for man made boards. Blades are between 600 and 650mm long, with 7 to 8 PPI.

Panel Saw

A panel saw has small (10 PPI) cross cut teeth and designed for cutting man-made boards to size, but can double as a crosscut saw for severing solid wood. The blades are between 500mm and 550mm long.

www.

Find out more

Collins Complete Woodworkers Manual Pg 110–117

Backsaws

Backsaws are made with relatively smaller crosscut teeth for trimming lengths of wood to size and for cutting woodworking joints. The special feature of all backsaws is the heavy strip of brass or steel folded over the top of the blade. This strip not only keeps the blade straight but provides sufficient weight to keep the teeth in contact with the wood without having to force the blade into the work.

Types of backsaws

Tenon saw		A tenon saw, having 13 to 15 PPI along a 250 to 300mm blade, is the largest and most versatile of the backsaw family. While it is possible to sever quite hefty sections of timber with a tenon saw, it is also suitable for precise work such as cutting tenons and other woodworking joints.
Dovetail saw		A dovetail saw is a smaller version of the tenon saw, but the teeth are too fine (16 to 22 PPI) to be set conventionally. Instead it relies on the burr produced by file sharpening to provide a very narrow kerf (the slot cut by the saw) required for cutting dovetails and similar joints. Dovetail saws have a traditional handle, either closed or pistol grip and are generally made with a 200mm blade. An alternative pattern, with a longer blade, has a straight handle.
Carcase saw		For cutting joints in draw runners, dividers, and stretchers (the framework, or carcase of a piece), this lightweight and manoeuvrable saw is scaled for smaller work than a tenon saw. The fine teeth (13PPI) are filed to a crosscut pattern and leave a smooth finish.

Curve cutting saws

A group of saws with narrow blades is made specifically for cutting curved shapes or holes in solid wood and boards. Various sizes and designs are available. Your choice will depend on the material to be cut and the scale of the work.

Types of curve cutting saws

Coping saw		The very narrow blade of a 150mm coping saw is held under tension by the spring of the metal frame. The 15 to 17 PPI blades are too narrow to sharpen, and are simply replaced when they break or become blunt. A coping saw blade can be turned to swing the frame out of the way, to facilitate cutting curves in either solid wood or man-made boards.
Fret saw		A fret saw with its 32 PPI blades, is used for cutting thin pieces of wood and board or shaping a sandwich of marquetry veneers. A fret saw cuts on the pull stroke, to prevent the blade from buckling.
Compass saw		A compass saw has a narrow tapered blade that is stiff enough to hold its shape and can be used to cut a hole in a board of any thickness as far from the edge as required. The blade is 8 to 10 PPI.

Defects in hand saws

The most common defect you'll find in a hand saw is that it is blunt. Other defects you may come across include a damaged handle, and a bent blade.

Note: Ask your trainer to show you how to tell when a saw is blunt.

Caring for hand saws

To ensure efficient cutting, keep the saw sharp. You should not need to force it through the timber. A saw with sharp teeth will cut nearly all timbers easily.

Because blades are made of steel, they need to be protected from rusting. To protect them, use a rag to apply a thin coating of machine oil to both sides of the blade.

Before you cut into any recycled timber, make sure there are no nails or bolts still in the timber. Attempting to cut steel with any wood cutting blade will ruin the teeth.

Have a think

» Think of a furniture job that would require the use of a saw.
Write your answer below.

» Which saw or saws would you need to complete the job you've just described?

Notes

06 Squares and sliding bevels

What you'll learn

Squares and bevels are tools used to check and mark angles. Squares range in size from about 100mm to 300mm, although a steel builder's square is around 600mm. The size of a square is measured from the inside of the stock to the end of the blade, and sometimes the blade is also marked in millimetres.

Try square

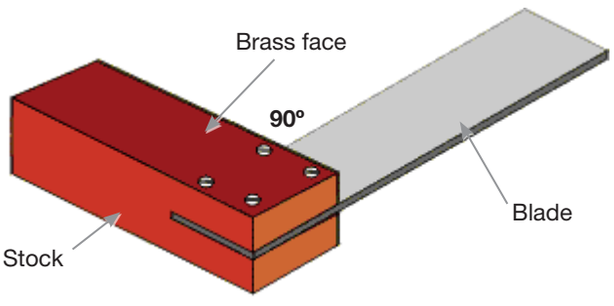
A try square is one of the most important tools used in a furniture factory, because most furniture designs are made in a “box construction”. Squares allow the furniture maker to quickly check that the construction is correct.

Using a try square

The finest try squares, used to mark and check right angles, have a blued-steel metal blade riveted at 90 degrees to a rosewood stock edged with brass.

When to use a try square

An example of when to use a try square is to check if a drawer is square. The drawer sides should be square (that is at 90°) with the drawer front, otherwise the drawer will not close correctly in the carcase.



Have a think

» Can you think of other furniture jobs that would require the use of a try square? Write your answers below.

Find out more

Collins Complete Woodworkers Manual Pg 106–109

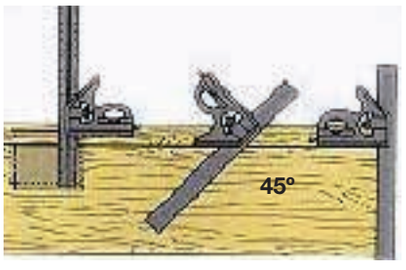
Combination square

The combination square is an all-metal tool with an adjustable blade that passes through the stock. You can lock the blade in any position by tightening the thumbscrew.

The stock has two precision-ground faces for marking angles of 90° and 45°. Keep the blade tightly locked in position.

Using a combination square

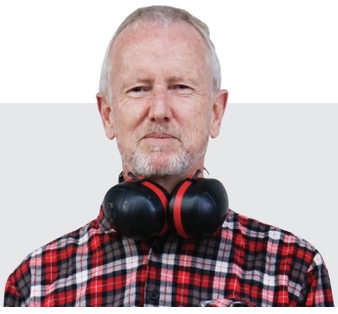
The blade is adjustable, and the combination square can be used for pencil gauging, and measuring the depth of rebates and grooves.



Defects in squares

The only real problem you're likely to encounter with a square is that it is not accurate. You should regularly test a square for accuracy because you can have problems setting out a job if your square is not accurate.

To test the square, hold the stock firmly against a straight edge of a board and mark a fine line along the blade. Reverse the square and place the stock against the same edge. If the edge of the blade doesn't match up with the line on the board, it is not square. That is, the blade is not at 90º to the stock. The correct position will be midway between the two lines.

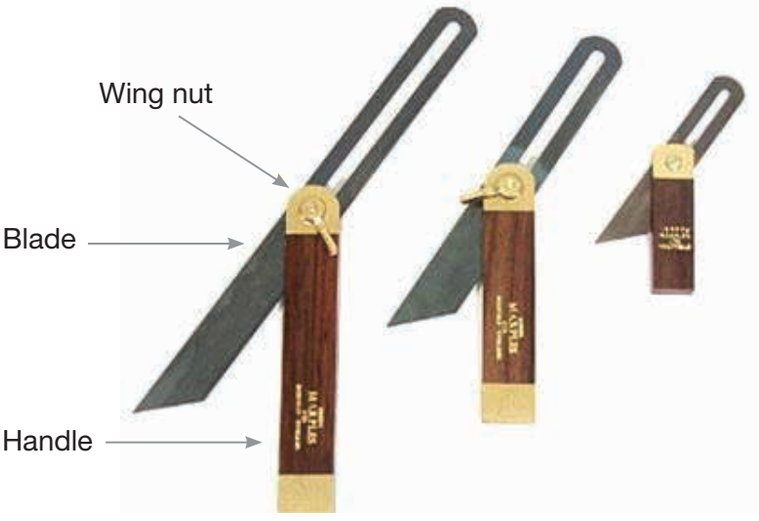


“It’s unlikely you’ll come across any defects in a sliding bevel, except if it was broken. Sliding bevels are fairly strong, and when looked after, should last a lifetime.”

Sliding bevel

A sliding bevel is an adjustable gauge for setting, testing, and transferring angles. The handle is made of wood or plastic. The metal blade pivots and can be locked at any angle – just loosen and tighten the wing nut. The end of the blade is angled at 45 degrees, for use on mitred corners.

The slotted blade pivots round a point at one end of the stock, and it can be set to any angle. You can adjust the length of the blade for marking across a board or have the blade extended on both sides of the stock for marking out dovetails.



Using a sliding bevel

To record an existing angle, loosen the wing nut, hold the handle against one surface, and press the blade against the other. Tighten the nut to lock the blade in place. To set the square to a specific angle, loosen the wing nut, hold the handle against the base of a protractor, and move the blade to the desired degree setting. Retighten the wing nut.

To test an angle, extend the blade fully from the handle when testing angles against the outside edges of the tool. Otherwise, the heel of the blade could cause an inaccurate reading.

Transferring angle from bevel to the job

07 Sharpening equipment

What you'll learn

Sharpening edge tools is a two-step process: grinding and honing. It is one of the most important skills you need to learn.

Grinding

Bench grinder

The bench grinder is used to grind steel cutting tool edges that have become damaged, or tools that have been honed several times. It can be used to produce straight, or shaped edges, depending on the kind of tool you're using.

The bench grinder must be bolted to the work bench so it doesn't move around while you're working. It must have the grinding wheels fully enclosed, except at the front quarter of the wheel. There should also be a transparent shield to protect your eyes from the sparks that come off the wheel during the grinding process.

If the grinder in your workplace doesn't have a shield attached, you must wear safety goggles to protect your eyes.

Using a grinder

Before you start grinding, make sure that the wheel is in good condition, and that it is not chipped or cracked. Ensure that the transparent shield is firmly in place, and that the tool rest is secure and in the correct position for the job you're doing. Ask your trainer to show you the correct settings for the tool rest.

Place the tool bevel down on the tool rest. Starting at one side of the tool, move it towards the grinding wheel. When the tool contacts the wheel, move the tool from side to side, keeping a light but even pressure. Regularly dip the tool in water to keep the steel cool, and prevent it from overheating.

Find out more

Collins Complete Woodworkers Manual Pg 136–137

Parts of a grinder

Defects

Overheating the tool steel causes it to turn blue. This causes the steel to lose temper, and the tool will not hold its cutting edge for long. If the steel turns blue, grind beyond the blue area.

If you don't keep the tool at a constant angle (25º), you'll end up with a rounded bevel. A rounded bevel can't be sharpened.

Have a think

» Why do you think sharpening your tools requires a two-step process?

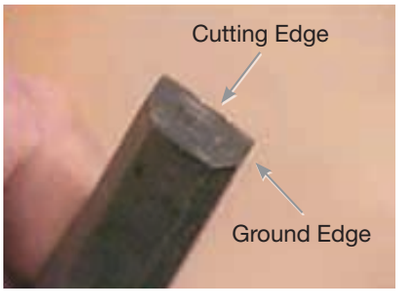
“Ask your trainer to show you this process, if you need to sharpen gouges.”

Honing

Honing method

Grinding on its own does not give you a good enough edge to produce a clean cut. The next step in the process is honing.

Honing is done by rubbing the ground edge on an oilstone. The oilstone removes the grinding marks and produces a perfectly sharp cutting edge. Before you start, you need to lubricate the oilstone using a light, thin oil, such as sewing machine oil.



Using an oilstone

To find the correct angle at which to hone a tool, place the ground bevel on the stone, and lift the back edge of the bevel off the surface of the oilstone.

Rub the tool back and forth along the oilstone several times. You will notice a burr forming on the back of the cutting edge. Turn the tool over, and remove the burr by rubbing the back of the cutting edge on the oilstone. If you're sharpening hand tools such as gouges, you'll need to use a small slip stone.

Oilstone

Defects in stones

The most common defect that occurs in sharpening stones is wear. Look for a slight hollow in the surface of your oilstone. This can be corrected by rubbing the surface of the stone on carborundum powder with water or oil, on a sheet of glass.

Get your trainer to show you how this process is carried out.

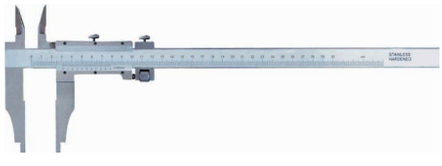
Find out more

Collins Complete Woodworkers Manual Pg 134–134

Have a go

Tool identification

» Match the picture to the name of the tool.

1		Spokeshave
2		Scraper
3		Vernier callipers
4		Mallet
5		Tape
6		Butt chisel

Answers: 1 – Mallet, 2 – Butt chisel, 3 – Spokeshave, 4 – Vernier callipers, 5 – Scraper, 6 – Tape

08 Screwdrivers

What you'll learn

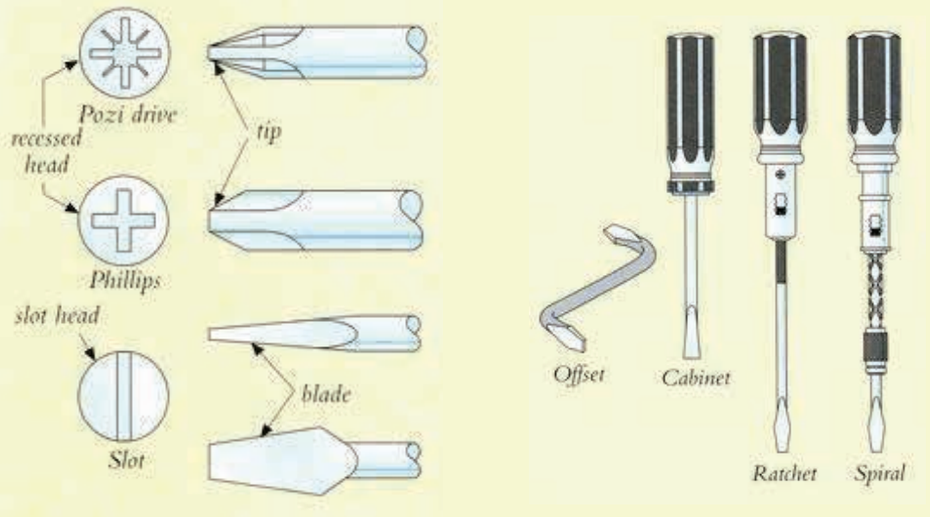
This section introduces you to the different types of screwdrivers used in furniture making.

Types of screwdrivers

Screwdrivers come in all shapes and sizes, to fit the wide range of screws available. They are used to wind a screw into a piece of wood or composite material, to hold components together, or hardware on components.

Each of these screwdrivers is available in a wide range of sizes from the fixed handle to the ratchet and the spiral ratchet. The fixed handle range varies in size from the small "stubby" (at around 65mm long), through to the largest fixed handle screwdriver (at around 350mm long).

Traditional cabinet screwdrivers



Screwdriver types

Square drive

Most furniture factories now use square drive tips and square drive screws.

Ratchet screwdrivers, too, range in size from about 150mm to 300mm.

By far the biggest screwdriver used in the furniture making workshop is the spiral ratchet screwdriver. The largest of these screwdrivers extend to around 600mm.

Square drive

Ratchet screwdrivers

Using a screwdriver

No matter what kind of screwdriver you're using, you must always choose the one which best fits the screw you’re using.

For example, if you're using a slotted screwdriver which has a blade that is bigger than the head of the screw, the timber surrounding the head of the screw will become marked.

On the other hand, if you're using a screwdriver which has a blade that is smaller than the head of the screw, you won't have sufficient power to turn the screw, and the head of the screw will become damaged.

Grip the screwdriver firmly, and turn the screw in a clockwise direction. Make sure that the screwdriver is perpendicular (at right angles) to the work, and that the tip fits snugly into the head of the screw.

Defects

Defects that commonly occur in the tips of screwdrivers are chips out of the blade. This is often caused by incorrect use, and a lack of care. The pressure caused by trying to over tighten a screw can lead to pieces of the screwdriver tip chipping off.

Have a think

» What type of screwdrivers do you commonly use?

» Are there any screwdrivers covered in this section that you are unfamiliar with?

Have a go

Screwdrivers and screws

» Match the picture to the correct name

1	 	Pozi drive screw
2		Slot head screwdriver and screws
3		Phillips screwdriver and screw
4		Pozi drive screwdriver and screws
5		Cordless screwdriver
6		Offset screwdriver

Answers: 1 – Slot head screwdriver and screws, 2 – Cordless screwdriver, 3 – Offset screwdriver, 4 – Pozi drive screw, 5 – Phillips screwdriver and screw, 6 – Pozi drive screwdriver and screws

09 Sanding blocks

What you'll learn:

In this section, you'll learn about:

» How to use a sanding block

» The defects you might encounter when using sanding blocks.

Sanding blocks

Sanding blocks are used by furniture makers to give furniture a final sand before it moves into the polishing shop. The block provides a firm base behind the sandpaper, as it is pushed back and forth along a surface.

Cork block

Rubber block

Using a sanding block

Cut a piece of sandpaper the length of the block, and twice its width. Wrap the sandpaper around the width of the block, with an equal overhang on each side. Hold both ends of the paper tightly.

Move the sandpaper and block along the direction of the grain, applying a slight pressure. This action should produce a fine dust, if the paper is cutting effectively.

It is much easier to sand a flat surface evenly if you wrap a piece of abrasive paper round a sanding block. You can make your own from an off-cut of wood with a piece of cork tile glued to the underside – but this is hardly worth the trouble when factory made cork or rubber sanding blocks are so cheap.

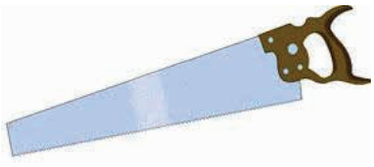
The only defect that occurs in a sanding block is wear. Continual use over a period of time will wear down the corners of the block, eventually rounding them over.

Have a go

Test your memory: handsaws

» Match the saw name on the right with the specifications on the left. One has been done for you.

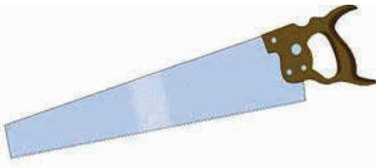
1



Blade between 600 and 650mm long, with 7 to 8 PPI. Ideal for cutting solid planks

Tenon saw

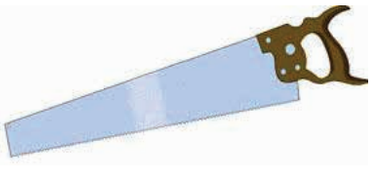
2



Blade between 500 and 550mm long with 10 PPI. Ideal for cutting man made boards

Rip saw

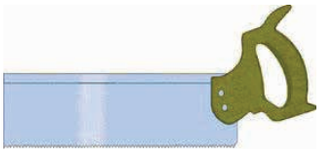
3



Has a 650mm blade with 5 or 6 PPI. Designed for cutting solid timber in direction of grain

Compass saw

4



Blade 250 to 300mm long with 13 to 15 PPI. Suitable for precise work such as joints

Crosscut saw

5

Can cut a hole in a board of any thickness. Blade is 8 to 10 PPI

Panel saw

Answers: 1 – Crosscut saw, 2 – Panel saw, 3 – Rip saw, 4 – Tenon saw, 5 – Compass saw

10 Cramps

What you'll learn

In this section, you'll look at the different types of cramps used in furniture making and how to use them with care.

Types of cramps

Some of the different kinds of cramps and their uses are:

» Sash, bar, and pipe cramps – assembling carcasses, edge to edge joints in both solid and composite board materials, assembling framed doors

» F-and G-cramps – holding work firmly on the work bench, holding components together for marking out

» Edge cramps – attaching clashings, or lippings, to the edges of curved components, for example, round table tops.

Have a think

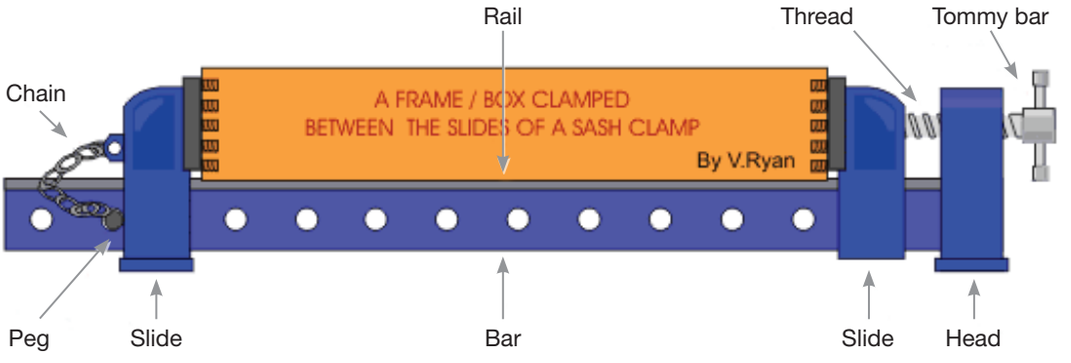
» Have you used any of the cramps mentioned above?

» If you have, what was the job?

“Cramping devices vary in shape and size depending on the job requirements. It is most likely that you’ll use sash, bar, or pipe cramps to assemble furniture. Other cramping devices include the quick action F-cramp, the G-cramp, and the edge cramp.”

Bar/Sash cramp

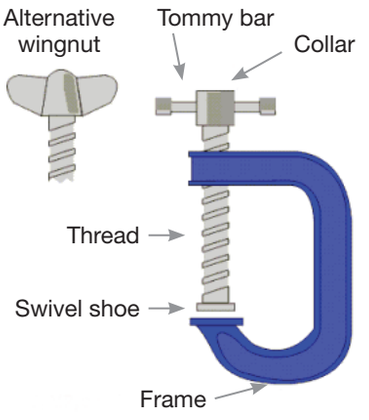
Bar cramps are used for assembling large frames, panels and carcases. Attached to one end of the flat steel bar is a screw adjustable jaw. To accommodate assemblies of different sizes, a second moveable jaw or tail slide is free to move along the bar and is secured at the required position with a tapered steel pin. The cramps range from 450mm to 1200mm.



Bar cramp

G-cramp

The G-cramp is an excellent general purpose cramp that is often used to hold wood firmly on a bench while you work on it. Usually made of cast iron, the frame forms a fixed jaw. Clamping force is applied by a screw fitted with a ball jointed shoe.



Fast-action cramp

These short fast-action bar cramps are used in situations where you could used G-cramps, but are especially handy when adhesive is rapidly setting.

Using cramps

When you’re cramping up a job, make sure to protect your work from damage from the shoes of the cramp by using cramping blocks. These sit in front of the shoes of the cramp. If you're cramping up a shelf in a carcase, use lengths of timber that have had a bow planed in them. The bow in the timber ensures that pressure is directed to the centre of the joint.

Caring for cramps

Take care not to over tighten the cramps. Over tightening can twist a cramp out of alignment. Never try to lengthen the handle using a piece of pipe. The handle length is designed to match the strength of the cramp.

The thread of a cramp should be lightly oiled occasionally to ensure that the screw will not jam.

Find out more

Collins Complete Woodworkers Manual Pg 150–151

Notes

11 Gauges

What you'll learn

The two kinds of gauge commonly used in the furniture industry are the marking gauge, and the mortice gauge. Both are used for marking or setting out work.

Types of gauges

Marking gauge

The marking gauge has a single pin, and is used to mark a line parallel to the edge of a component.

Mortice gauge

The mortice gauge has two pins, one of which is adjustable, allowing you to mark two parallel lines at the same time. These are particularly useful if you're setting out mortice and tenon joints to be cut by hand, or when you're setting out the positions of dowels on the ends of rails and narrow components.

Find out more

Collins Complete Woodworkers Manual Pg 108–109

Using a gauge

Before you can use a gauge of any kind, you need to set it up. To set a gauge:

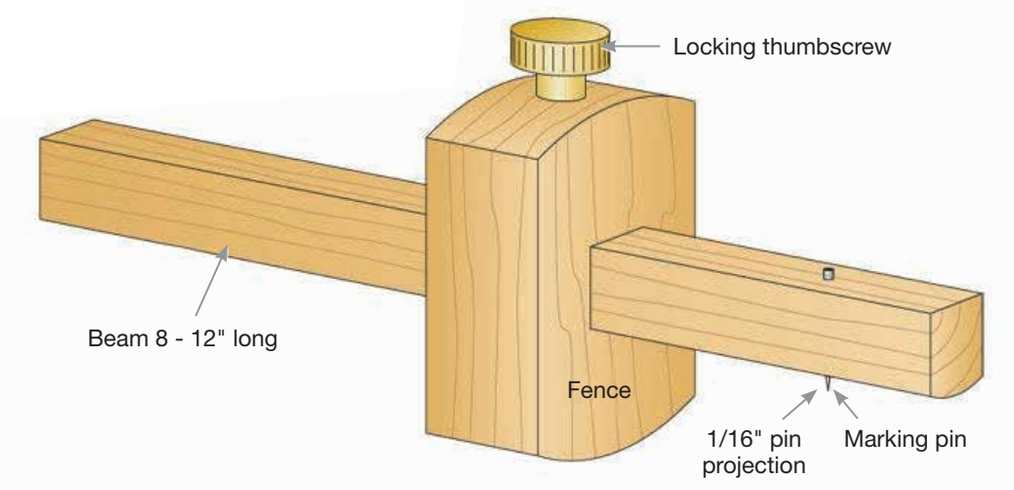
» Adjust the stock using a rule to give an accurate measurement, to the required distance from the pin

» Tighten the thumbscrew to lock the stock in place

» To make fine adjustments, tap either end on your bench

» When it is set correctly, fully tighten the thumbscrew.

The parts of a gauge



Have a think

» When would you use a marking gauge instead of a mortice gauge for furniture marking?

12 Word list

Bevel	A surface that meets another at an angle other than a right angle.
Bruise	To dent timber by striking it with a hard object.
Burr	An extremely thin strip of metal left along the cutting edge of a blade after honing or grinding.
Claw	Split hammer peen used to grip a nail by its head and lever it out of a piece of wood or board.
Ferrule	A metal collar that reinforces the wood where the tang of a chisel or other hand tool enters the handle.
Gauging	Marking out a piece of wood with a marking gauge.
Gullet	Space between saw teeth.
Hone	To produce the final cutting edge on a blade or cutter by rubbing it on or with an abrasive stone.
Kerf	The slot cut by a saw.
Peen	The rear end of a hammer, the other end being the striking face.
Tang	The pointed end of a chisel or file that is driven into the handle.
Temper	The degree of hardness and strength.

Reference

Jackson, Albert. & Day, David. (2005) Collins Complete Woodworkers Manual (revised edition). Harper Collins Publishers London W6 8JB.

Done!

Ka pai, nice one!

You have finished your workbook.

You should now know:

- Hammers and mallets
- Chisels
- Measuring tools
- Hand saws
- Squares and sliding bevels
- Sharpening equipment
- Screwdrivers
- Sanding blocks
- Cramps
- Gauges.

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