30 Fastenings and Fixtures

KEYWORDS

countersunk
hinge
oval nails
panel pins
staples
upholstery

Fastenings and other items of hardware are used to finish off projects. You will be familiar with nails and screws, hinges and handles. In fact, there is a variety of products to suit specific woodwork pieces. You should be familiar with a number of these.

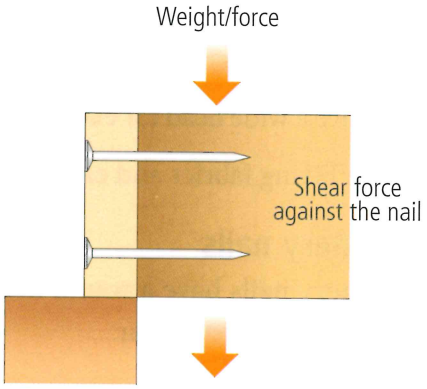
NAILS

A carpenter uses large nails for securing pieces of wood together. There are other special nails for specific jobs. Nails work best when the force acting on them is at 90° to the shank (shear force).

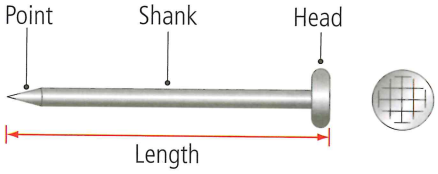
Round wire nails

Round wire nails are large and have round heads. They come in sizes from 25 mm to 150 mm.

- Use: Constructing roofs, timber partitions and floors



Nails work best when the force acts against the shank

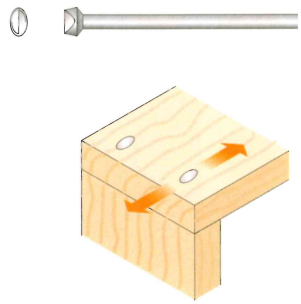


Round wire nail

Oval nails

Oval nails are light and have oval heads. First, the nail is driven below the surface of the timber. Then the hole is filled. Oval nails should always be driven with the two points of the head in the direction of the grain as shown opposite. They come in sizes from 25 mm to 150 mm.

- **Uses:** Suitable for nailing thin pieces of timber
- Nailing close to the ends of timber pieces where splitting might occur



Oval nails should be dri in so that the oval head line with the grain

Panel pins

Panel pins are small nails with small heads. The head is punched below the surface of the wood. Panel pins are coated (galvanised) to make them resistant to corrosion. Panel pins bend if driven incorrectly.

- **Use:** Light work
- Fixing mouldings to timber

Panel pins

Tacks

Tacks have a wide head for extra grip. They have a very sharp point.

- **Use:** Fixing fabrics and carpets

Tacks

Upholstery nails

Upholstery nails have a round head. They are decorative, often brass or bronzed in colour.

- **Use:** To secure fabric to chairs and stools

Upholstery nails

Clout nails

Clout nails are short nails with a wide head. The head spreads the pressure of the nail, preventing it tearing felt. They are galvanised to prevent them rusting. They come in copper also.

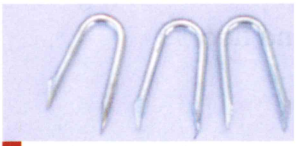
- **Use:** Outside for securing roofing felt

Clout nail

U-shaped nails

U-shaped nails are like **staples**. They are galvanised to prevent them from rusting.

- **Use:** Fixing fencing to wooden posts



U-shaped nails

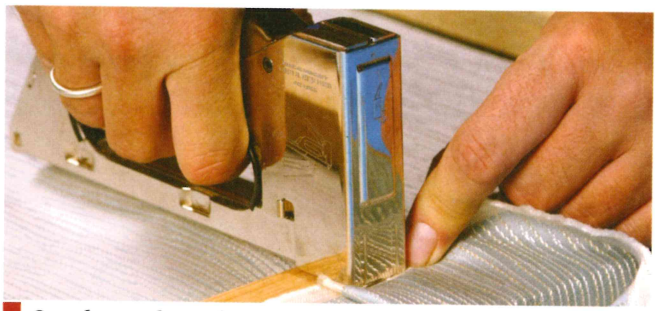
Staples

Special staples are used in a staple gun for fixing fabrics to wood. The staples come in various sizes. Take care when using a staple gun. If it is discharged into the air, a staple could easily go into a person's eye.

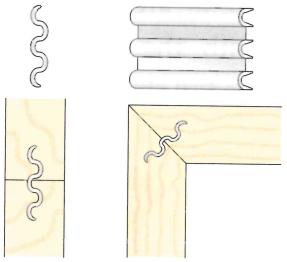
Corrugated fasteners

Corrugated fasteners are made from corrugated metal. They are inserted with a special tool or air gun.

- Use: Joining boards and reinforcing mitres



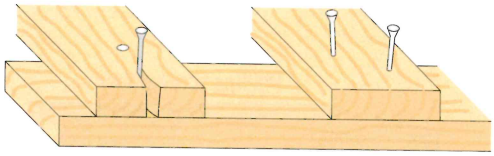
Staples and staple gun



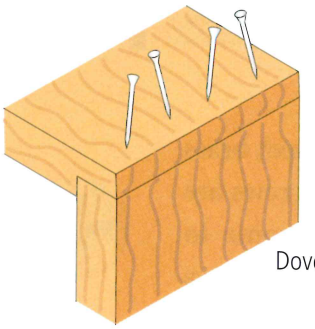
Corrugated fastener

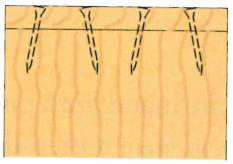
Nailing

Nails can be difficult to drive in correctly. It is important that you hit the nail squarely on the top with the hammer. Here are some ways of inserting nails to give extra strength to the joint.

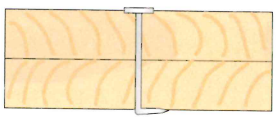


Stagger nails to avoid splitting the end of the wood

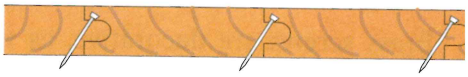




Dovetail nailing will add grip to the joint



Clinched-over nail – strong but unsightly



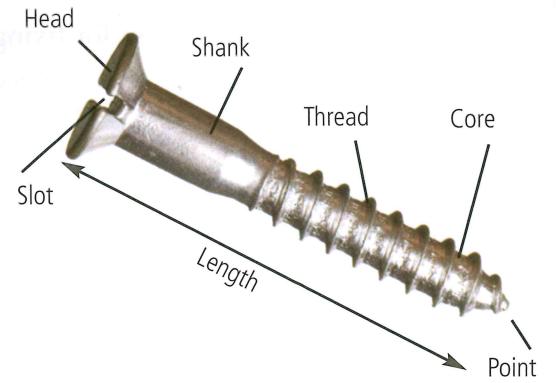
Tongued and grooved floorboards – secret nailing

Nailing methods

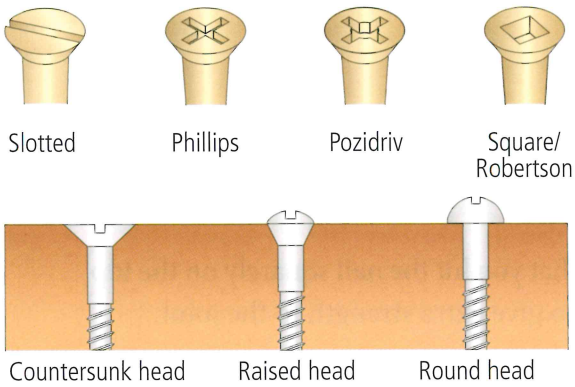
Screws

Screws have many uses, for example joining pieces together and attaching handles and hinges. Screws have a strong grip because of the threaded part, which pulls the screw into the piece.

Screws are classified according to the shape of the head. The common head types are shown below. The Phillips and Pozidriv screws are suited to modern materials with the deep threads that extend up the full shank of the screw.



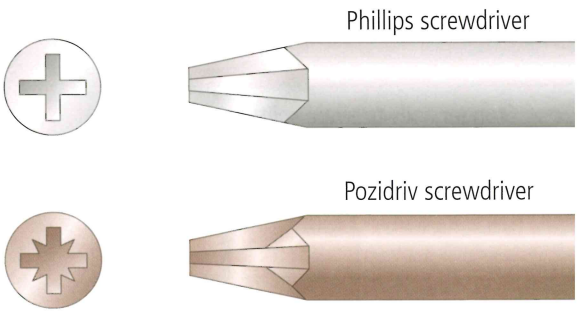
Parts of a screw – the length of the screw is measu from the head to the point



Screw heads

Phillips head screws

Screws are made from mild steel, brass and stainless steel. Often the screws are coated with zinc, brass or chrome to prevent them from corrosion. As screws rust easily in damp conditions, it is best to use brass or chromium-plated screws. Brass screws are decorative, as well as being corrosion-resistant. However, brass is soft and can break, or be damaged easily when driving the screw into the material.



The Pozidriv head allows a better grip for the point the screwdriver

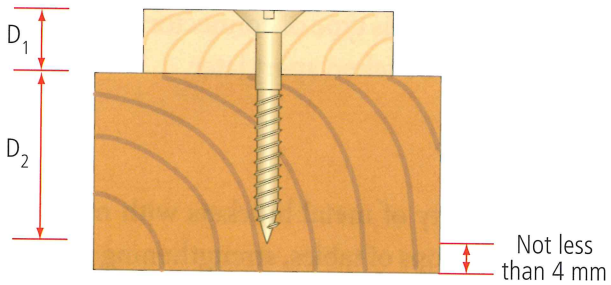
Ordering screws

Screws may be chosen according to:

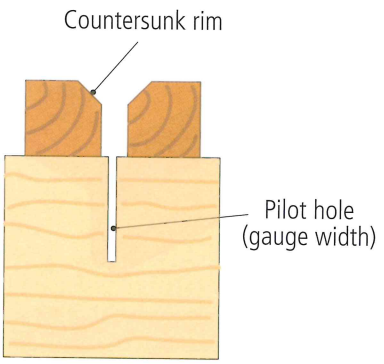
● The length of the screw	30 mm
● The diameter of the screw	No. 3.5
● The type of head	Countersunk, Pozidriv
● The type of material	Brass, steel, etc.

A screw should be at least twice as long as the thickness of the piece it is securing. A pilot hole should be drilled before inserting a screw. This ensures that the screw is driven with gentle force, which will not damage the head of the screw. The hole is usually **countersunk** to leave the screw flush with the surface.

Box of screws showing size and type of screw



The screw should be at least twice as long as the piece it is securing



A pilot hole should always be drilled

Self-tapping screws

Self-tapping screws are designed to be driven directly into metal. They have a modified point that drills a hole before it.

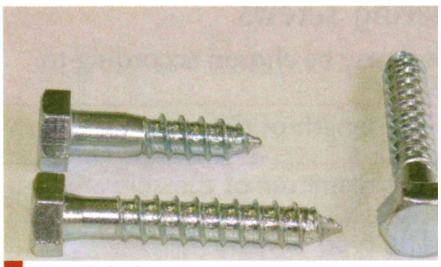
■ **Use:** Securing metal

Self-tapping screws

Coach screw

The coach screw or coach bolt is a heavy duty fixing with a screw thread and a hexagonal head. It is driven in using a spanner.

- **Uses:** Fixing heavy timbers and hanging gates
- Securing machinery to the bench or floor

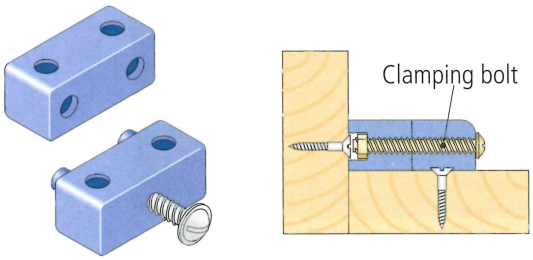


Coach bolt

Other screws

There are other items of hardware that are screwed into the surface of timber. A number of examples are shown below.

Cup hook and screw eyes



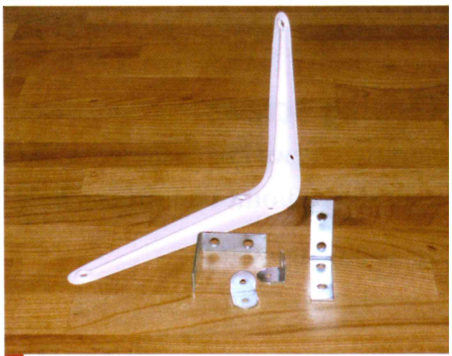
Knock-down fittings

Knock-down fittings

Knock-down fittings are joiner blocks designed to m self-assembly furniture easier. They are usually plastic metal. Timber joiner blocks can also be made quite ea The main advantage of this type of connector system is it allows the pieces to be taken apart later.

Angle brackets

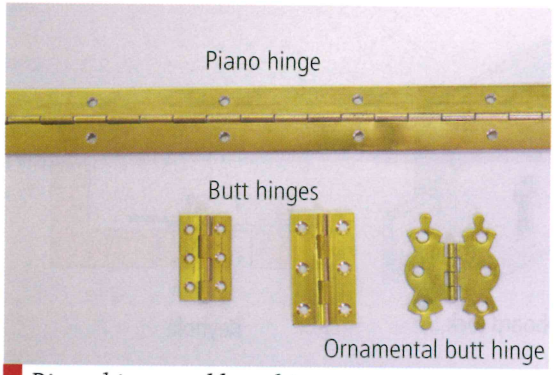
There is a wide variety of metal brackets with many u such as securing the tops of tables, strengthening joints for supporting shelves. Shelf brackets can be replace shelf supports which are easily concealed.



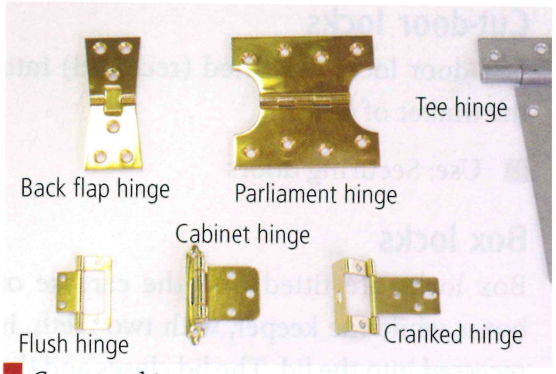
Selection of metal brackets and suppo

Hinges

Hinges allow things to swing open, like the door of a room or the lid of a box. There are many different types of hinge. It is important to select the correct type and size of hinge when planning a project. Hinges are usually made from brass or steel although other materials are used.



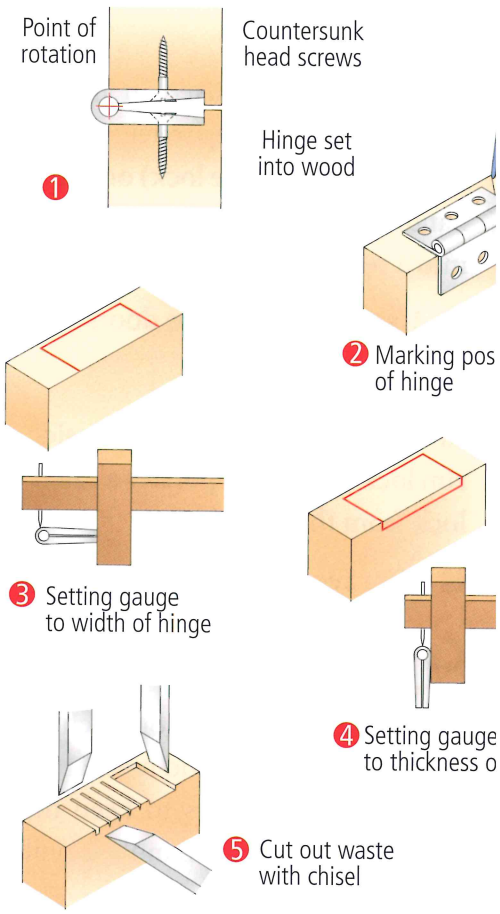
Piano hinge and butt hinges



Common hinges

Fitting a butt hinge

- Mark out the position and dimensions of the hinge on the frame
- Mark the position using a rule and a try-square
- Use a marking gauge to take the dimensions to set the depth and thickness of the hinge
- Mark the waste (as shown) and remove it using a sharp chisel
- Taper the recess, as this prevents 'pinching' of the hinge (when the door or lid springs open rather than stays shut)
- Fix the hinge into place



Fitting a hinge

Locks

Locks are used for security. They are attached to the surface of doors and gates, to lids of boxes and drawers. There are many styles and sizes. Most locks have two main parts, the ward and the receiver. The ward moves into the receiver to close the lock.

Some locks are fitted straight on to the timber surface, while others have to be inserted into a mortise or recess, which is cut into the wood.

Cupboard locks

Cupboard locks are inexpensive. They fit directly on to the insides of cupboard or press doors.

- Use: Securing cupboards

Cut-door locks

Cut-door locks are fitted (recessed) into the timber of doors.

- Use: Securing doors

Box locks

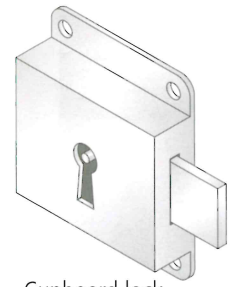
Box locks are fitted into the carcase of boxes while the keeper, with two teeth, is recessed into the lid. The lid closes and the key turns a mechanism that holds the two teeth down, thus making the box secure.

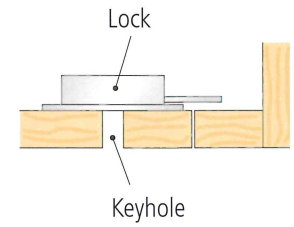
- Uses: Securing piano tops, jewellery boxes and cases

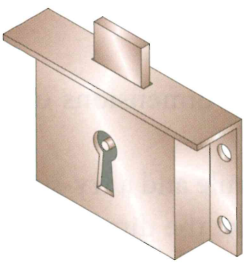
Mortise locks

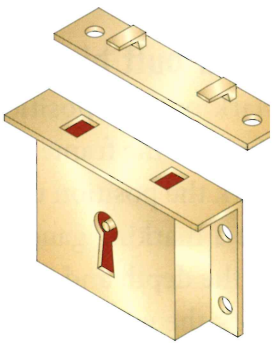
Mortise locks are used in house doors. They can be fitted separately (called a dead lock or dead mortise lock) or as part of the handle of the door. The ward moves across into a receiver fitted into the doorframe.

- Use: Securing house doors


Cupboard lock




Cut-door lock


Box lock


Various escutcheon plates

Cupboard lock, cut-door lock and box lock

Rim locks

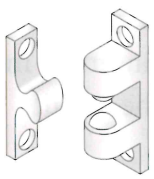
Rim locks are screwed to the inside of doors. The keeper (receiver) is screwed to the frame. rim lock often incorporates a catch which can be hand operated inside. A key is used to ope lock from the outside.

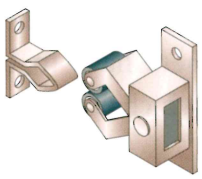
- Use: Securing the backs of front doors

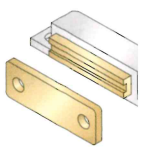
Catches

There are many types of catch and they have different styles and mechanisms such as magnets or rollers to keep the lid or door closed until the handle is pulled.

- Use: Securing lids and cupboard doors


Double ball catch


Roller catch


Magnetic ca

Catches

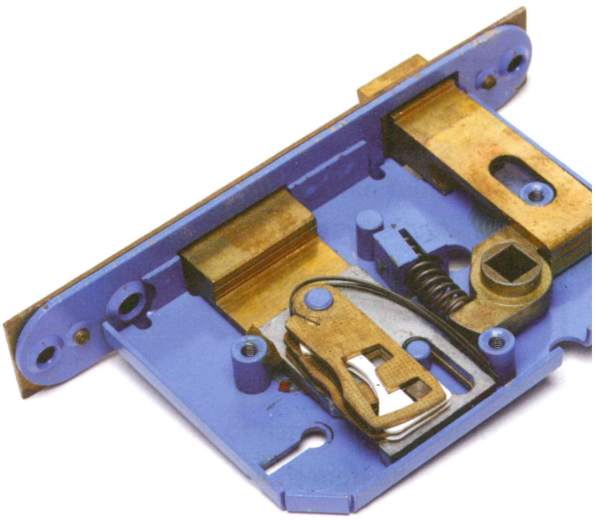
Door latch

- Use: Securing side doors, outside doors and gates

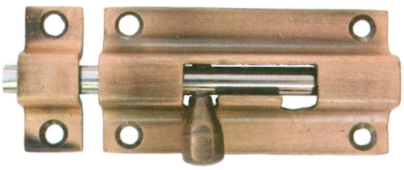
Barrel bolts

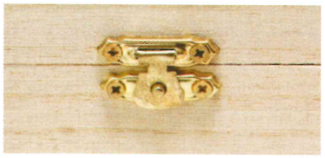
Barrel bolts have a receiver fixed on to the doorframe. Different types and sizes are available and many can be used with a padlock. They are available in brass and steel. They are galvanised for outdoor use.

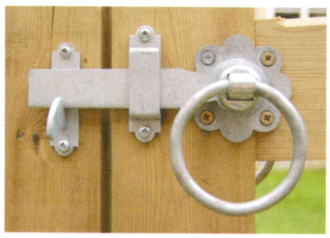
- Use: On doors and gates as a security bolt

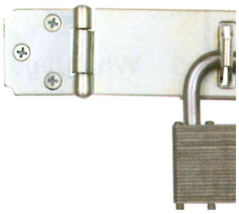


Mortise lock









Barrel bolt, hasp and staple and door latches

Handles

There is a wide variety of handles available for doors, cases, drawers and much more. Handles are made from wood, brass, plastic, rope or chain. They are attached in a variety of ways. When choosing a handle for a project, make sure that the handle is the correct size for the piece – neither too large nor too small.

Handles

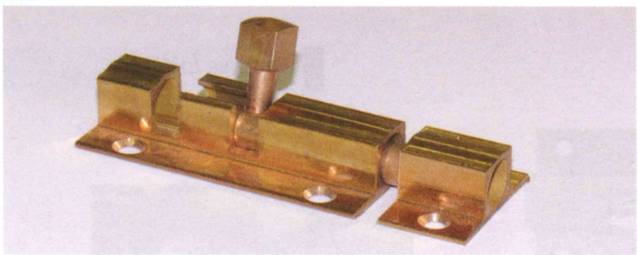
Exercises

1 Draw a neat freehand sketch of each of the following:
- Butt hinge
- Clout nail
- Angle bracket

2 Explain where each of the following would be used:
- Oval wire nail
- Coach screw
- Tee hinge

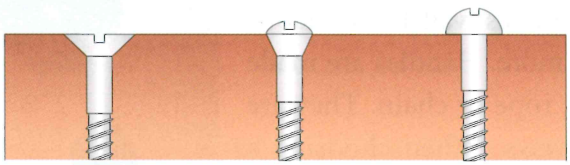
3 Draw a neat sketch to show how wood is prepared to receive a countersunk screw.

4 Name the item shown in the photograph below and describe where it would be used



5 What type of lock is shown in the photograph below?

6 Shown in the diagram below are the heads of three types of screw. Name each type.



7 Give two advantages of using screws instead of nails to join wood.

8 Draw a sketch of a countersunk screw. Label the parts and the length of the screw.

Exercises

9 State one reason for using a Pozidriv screw instead of a slotted screw.

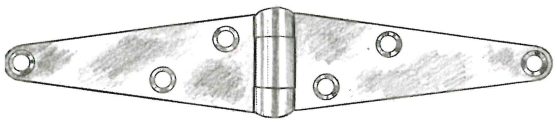
10 In dovetail nailing, the nails are hammered in at a slight angle. What is the purpose of this type of nailing?

11 Draw a sketch of a nail that has been clinched over.

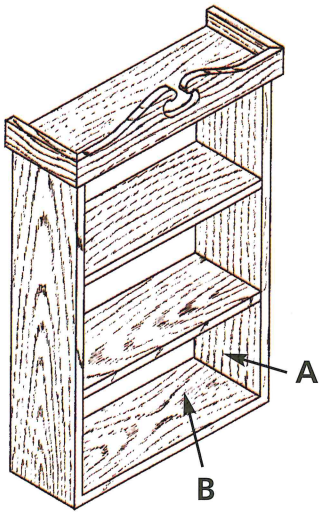
12 Explain the term secret nailing.

Exam Questions

1 Name the fitting shown and give its correct use.
(JC, OL, 2009)



2 The shelves need to be adjustable to different heights. Using notes and sketches, suggest one method that could be used to support the shelves yet leave them adjustable.
(JC, OL, 2006)



Web Links

http://home.howstuffworks.com/screws.htm
www.technologystudent.com/joints/nail1.htm
www.ironmongeryonline.com