CONSTRUCTION
Hand Tools

INFORMATION FOR QUESTIONS 13 - 24

FOLDING STOOL MAKERS

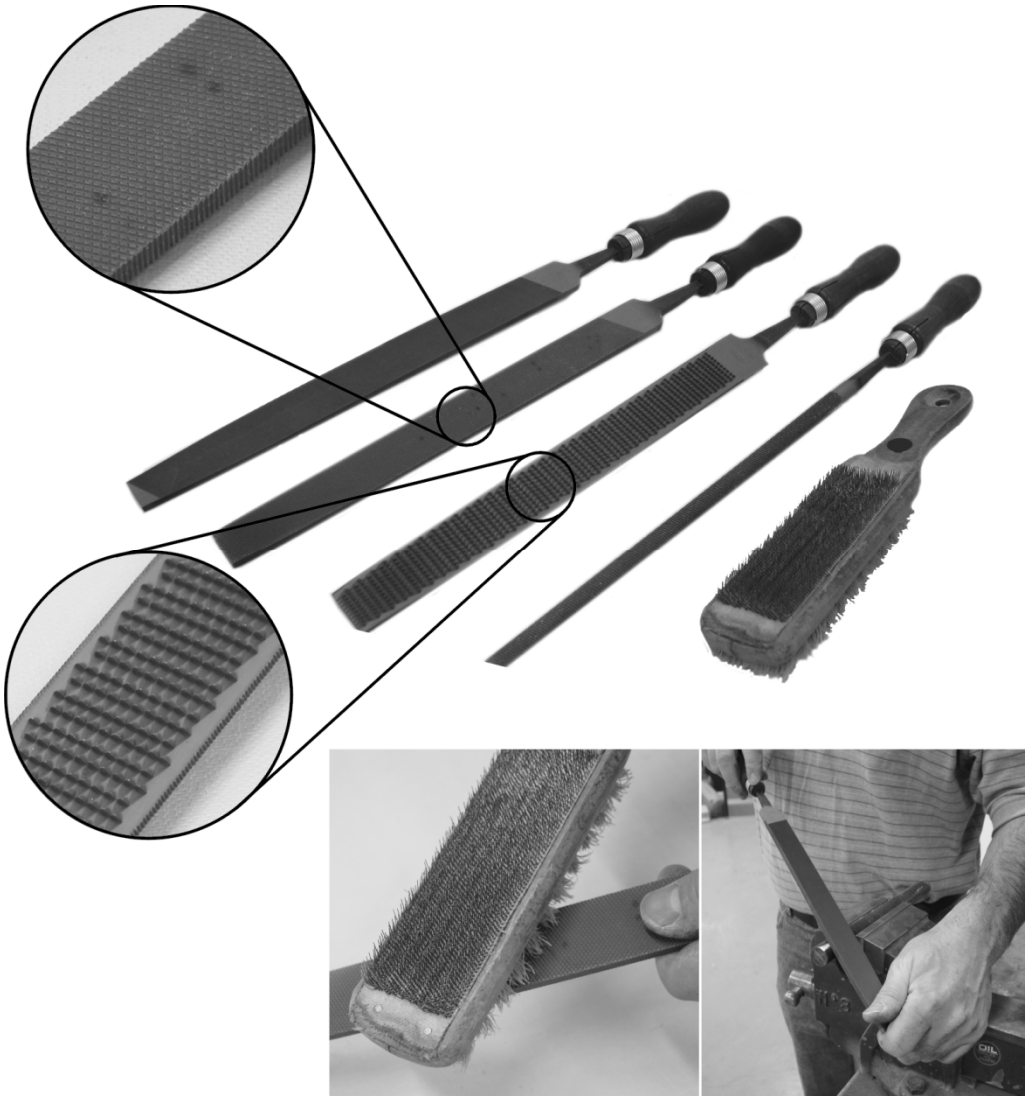


Figure 51 - Files, rasp and file card.

Cuts of a File

The four basic styles of *cuts* of a file are single, double, rasp and curved (Figure 52).

Single-cut files have a single row of parallel teeth running diagonally across the face. They are used primarily on metal when a smooth finish is desired.

Double-cut files have two intersecting rows of teeth that contain hundreds of cutting edges for fast removal of material and easy clearance of chips. They are primarily used on metals, but can also cut wood. Both single-cut and double-cut files are manufactured in various degrees of coarseness; in sequence they are: *rough, coarse, bastard, second cut, smooth* and *dead smooth.*

NOTES

Wood Scrapers

A *wood scraper* has a wood or impact-resistant plastic handle with a wide, U-shaped, replaceable blade that has two cutting edges (Figure 56). This tool is used to remove excess glue, existing paints or other finishes.

Figure 56 - Wood scraper.

Putty Knives

The *putty knife* has a thin steel blade that is attached to a wood or impact-resistant plastic handle (Figure 57). The steel blade can be stiff or flexible. Stiff blades are better suited to general scraping tasks; flexible blades are better suited to nail and hole filling.

Figure 57 - Putty knife.

NOTES

Sanding Abrasives

The term *sandpaper* is used to describe a variety of sheet abrasives (Figure 58). Carpenters use 60, 80, 100 and 120 grit to prepare wood for finishes, with the range from 150 to 600 used to smooth wood that has been finished with paint, varnish, polyurethane or lacquer. The smaller the grit number, the more course the sandpaper. (ie) 40 is more rough than 220.

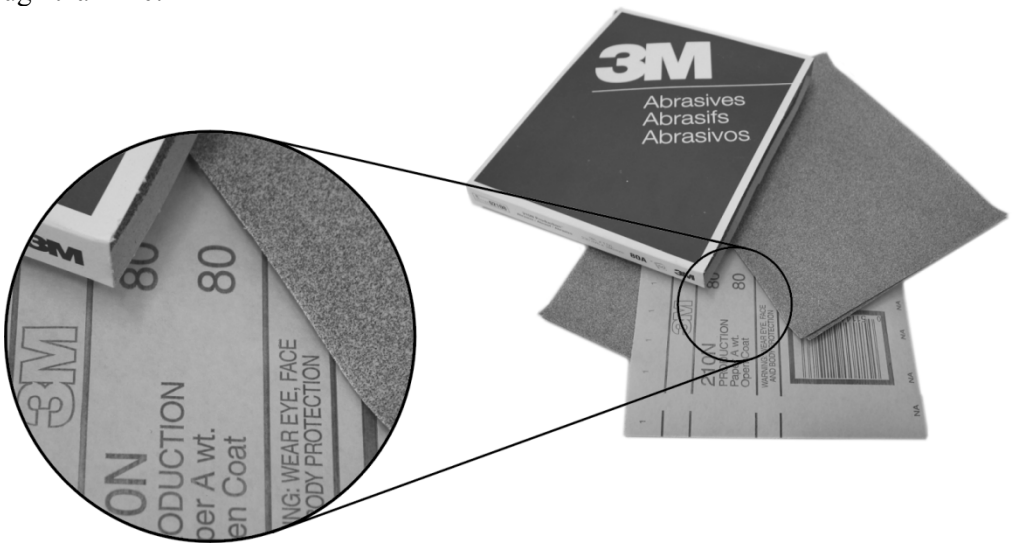


Figure 58 - Sandpaper.

Sanding Blocks

You will achieve a smoother, flatter finish when sanding by hand if you use a sanding block. Inexpensive, commercially made sanding blocks are available, or you can make one from a piece of wood that is softer than the material you are sanding. Sanding blocks can be flat or made in any shape to match the profile of the material being sanded (Figure 59).

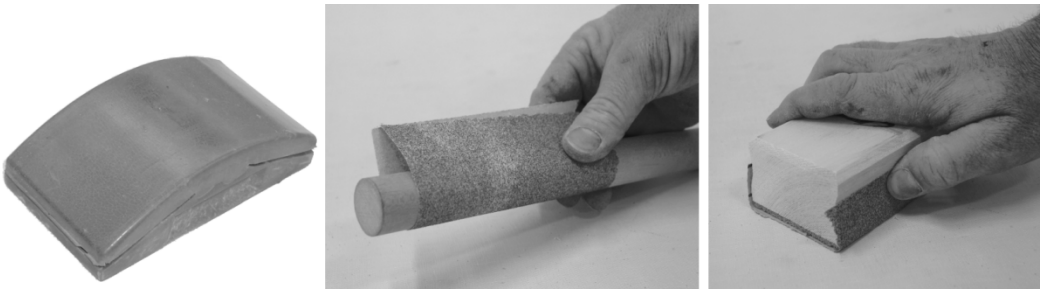


Figure 59 - A collection of sanding helpers.

Objective Three

When you have completed this objective, you will be able to:

Describe the use of assembling, dismantling and clamping tools.

Assembling Tools

Hammers

The nailing hammer is the carpenter's primary hand tool. Hammers are available in many styles, at a variety of prices. The merits of each type can be argued, but the selection should ultimately be the type that suits the task at hand and individual preference. Size is determined by the weight of the head, with 16 to 24 oz being the most common.

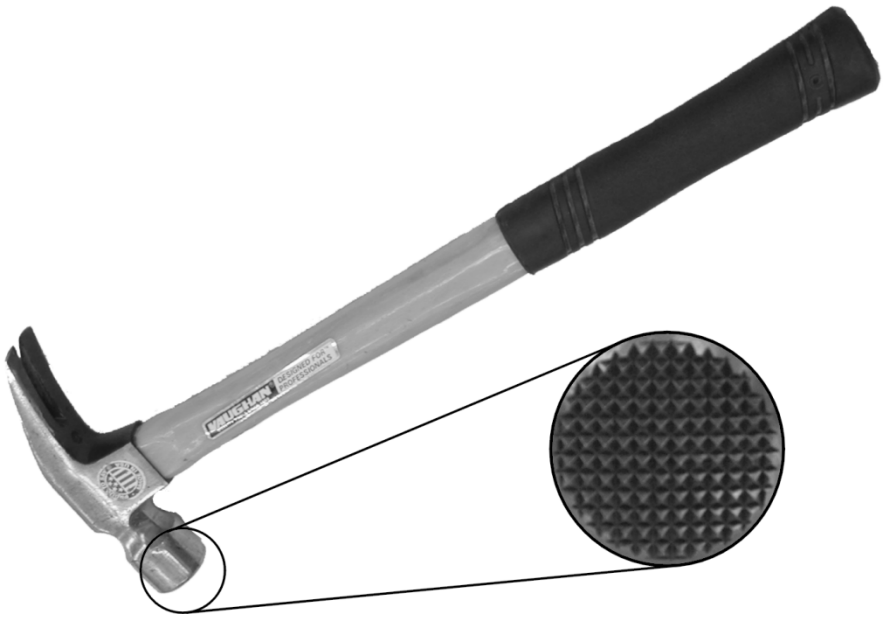
Curved Claw Hammers

The *curved claw hammer* is generally the lightest of the hammers and is used for finishing work (Figure 62). The belled or crowned striking face allows the nail to be driven flush to the surface without marring the wood surface. The crowned face also acts to automatically correct off-centre strikes, minimizing nail deflection and bending. The curved claw gives a higher mechanical advantage for nail pulling.

Figure 62 - Curved claw hammer.

Straight (Ripping) Claw Hammers

The *straight claw hammer* is generally heavier (22 to 32 oz) than the curved claw hammer (Figure 63). The straight claw is useful for prying and splitting. Framers prefer the milled (serrated) face, which grips the nail head to reduce slipping. The weight of the straight claws is positioned directly behind the hammerhead, producing heavier blows.



Nail Sets

The *nail set* is used to *set* nails below the surface (Figure 66). Its cup-shaped (concave) and chamfered tip is made in various diameters. Use a tip diameter that is slightly smaller than the head of the nail being driven. The cup shape at the tip provides for excellent nail head holding; without it the nail set tends to slip and damage the surrounding wood surface.

Figure 66 - Nail set.

Hammer Tackers/Staple Gun Tackers

The *hammer tacker* is used like a hammer to drive staples (Figure 67). It is mainly used to apply building papers and polyethylene vapour/moisture barriers.

The *staple gun tacker* is a manual staple gun that gets its power from a large spring that is cocked and released when the handle is squeezed (Figure 67).

Figure 67 - Hammer tacker and staple gun.

Screwdrivers

The common *screwdriver* is used for driving screws and comes in a variety of types and sizes (Figure 68). Good-quality screwdriver blades are made from chromium-plated, high-strength, alloy steel and may have a black oxide tip. The length of the blade determines its size; very short-bladed screwdrivers are known as *stubby* screwdrivers. The first requirement in choosing a screwdriver is that the screwdriver tip fit the screw head in shape and size.

Figure 68 - Screwdrivers.

Standard Slot Tip Screwdrivers (Keystone)

Standard slot tip, or *keystone tip*, screwdrivers are the most common and come in a wide range of blade tip widths and blade lengths (Figure 69).

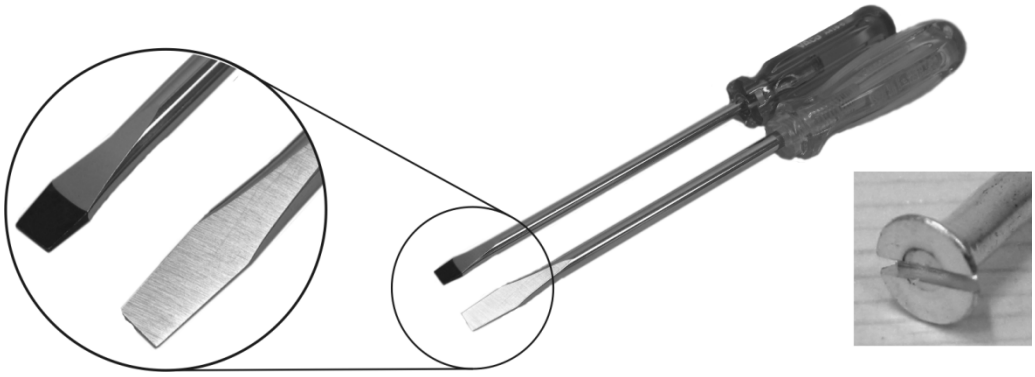


Figure 69 - Standard slot tip screwdriver.

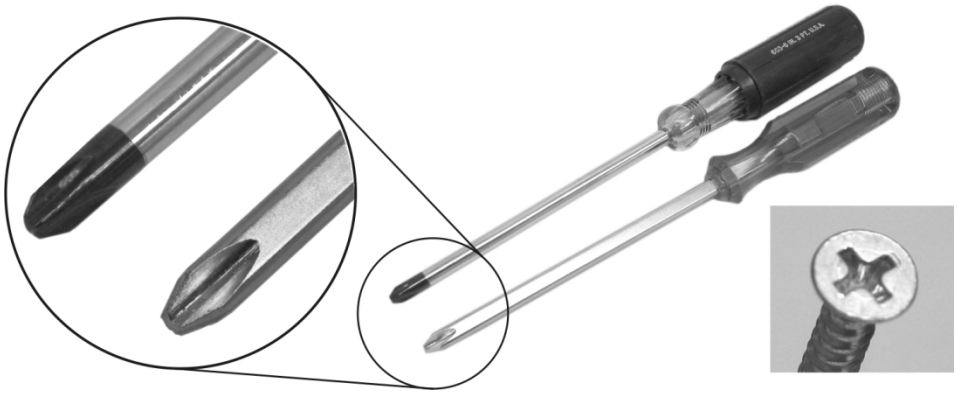
Cabinet Tip Screwdrivers

The *cabinet tip screwdriver* differs from the standard slot tip in that it is parallel from the tip back, which allows access to screws in recessed holes (Figure 70).

Figure 70 - Cabinet tip screwdriver.

Phillips Tip Screwdrivers

The *Phillips tip screwdriver* is shaped like a cross (Figure 71). Because of the unique shape of the screw head, the tip must be ground to close tolerances and made from high-quality, heat-treated steel. Low-quality tips do not fit the screws properly and will ruin the screw heads. Tip sizes are designated #0, #1, #2, #3 and #4 (smallest to largest).



Robertson Tip (Square Recess) Screwdrivers

The *Robertson tip* screwdriver is square and the handles are usually colour-coded to correspond with the tip size (Figure 73). The most common sizes and corresponding colours, smallest to largest, are #0 (yellow), #1 (green), #2 (red) and #3 (black).

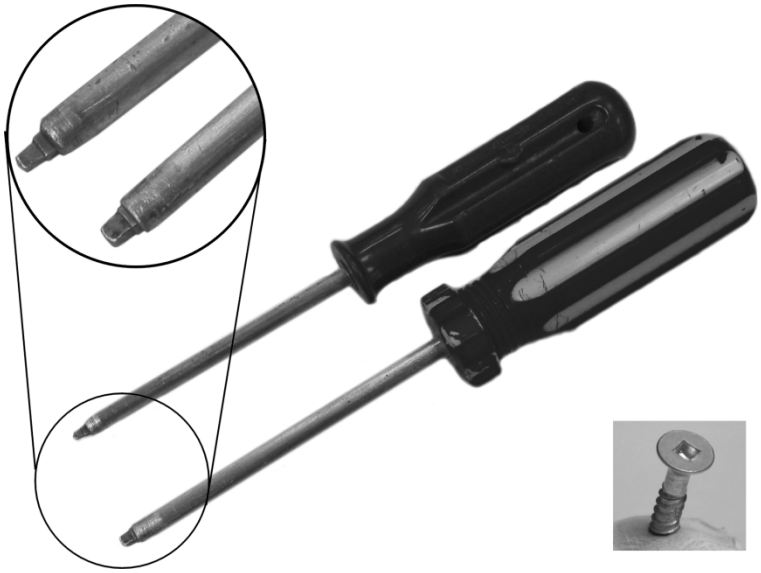


Figure 73 - Robertson tip (square recess) screwdriver.

Multi-Tip and Ratchet-Type Drivers

The *multi-tip* and *rachet-type* screwdrivers have impact-resistant plastic handles that are used to store a variety of replaceable screwdriver tips (Figure 74). Those with a ratchet type handle make it easier to install or remove a screw without changing your grip on the tool.

Figure 74 - Multi-tip ratchet driver with bit storage in the handle.

Figure 75 - Offset drivers and ratchet type offset drivers.

Pliers and Wrenches

Carpenters use *pliers and wrenches* for a variety of tasks, such as setting up and adjusting machinery, fastening and dismantling structural members and working with metal hardware.

Slip Joint Pliers/Groove Joint Pliers

Slip joint pliers are the most versatile of pliers, and are used for gripping small, large and circular objects (Figure 76).

Groove joint pliers are similar to the slip joint pliers, except they are bigger with a wider opening and have a much higher mechanical advantage (Figure 76). The grooved joint mechanism allows the jaws to slide and interlock at various points while they remain parallel.

Figure 76 - Slip joint and groove joint pliers.

Linesman's Pliers/Needle-Nose (Long Nose) Pliers

Linesman's pliers are used for gripping, twisting or cutting wire (Figure 77). *Needle-nose pliers* are used for gripping small items or to grasp an object in a confined area.

Figure 77 - Needle-nose and linesman's pliers.

Locking Pliers (Vise Grips)

Locking pliers are used for gripping, with the added feature of being able to lock on the object being gripped (Figure 78).

Figure 78 - Locking pliers (vise grips).

Diagonal Pliers/End Nipper Pliers

Diagonal pliers also referred to as *side cutters* are used for cutting wire and small nails (Figure 79). *End nipper pliers* can be used to extract and cut nails, wire or small fasteners close to the surface of the material.

Figure 79 - Diagonal and end nipper pliers.

Adjustable Wrenches

The *adjustable wrench* consists of one fixed jaw and one adjustable jaw that can be moved by turning a knurled worm gear. When using the adjustable wrench, apply pressure in the direction indicated in Figure 81 to avoid slippage and damaging the nut.

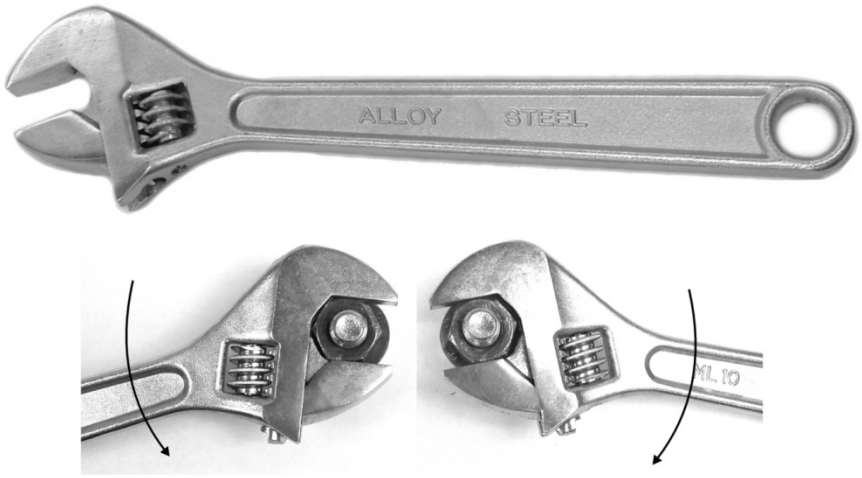


Figure 81 - Adjustable wrench.

Allen Wrenches

Allen wrenches (hex keys) are used for the socket-type machine screws found in machinery and hardware (Figure 82).

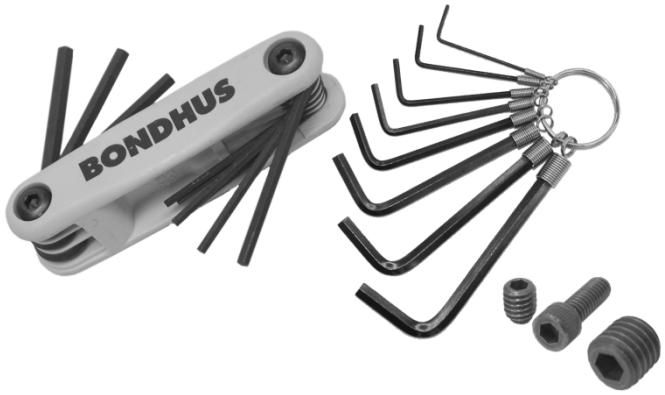


Figure 82 - Allen wrenches (hex keys).

Clamping Tools

Carpenters use clamping tools to temporarily hold components. Fast-drying modern glue may have reduced the number of clamps needed by the carpenter, but there is still a need for a variety of clamps for different purposes. Clamps are used to hold pieces during assembly or gluing and to hold jigs, stops and templates in place. Clamping blocks should be used if material being clamped could be crushed or damaged. Using clamps when working around power tools or equipment can substantially enhance safety and accuracy.

Bar Clamps

The *bar clamp* is the oldest type of industrial clamp. It utilizes a fixed jaw or head and moveable jaw or head, a screw handle, and a metal or wooden bar (Figure 86). Bar clamps are available in a wide range of sizes. Many types of *fast action* bar clamps are also available. Fast action bar clamps have a mechanism that allows for quick adjustment.

CAUTION
Avoid using fast action bar clamps to hold jigs or guides to machinery. Machine vibration may cause these clamps to loosen.

Figure 86 - Bar clamps.

Pipe Clamps

The *pipe clamp* comes in a kit form designed to convert 12.5 mm (½") and 19 mm (¾") standard thread black or galvanized pipe into a form of bar clamp (Figure 87). This is an inexpensive solution to large clamping problems because only the length of the pipe limits the clamp's length. If both ends of the pipe are threaded the clamps length can also be extended by attaching a coupler and an additional length of pipe.

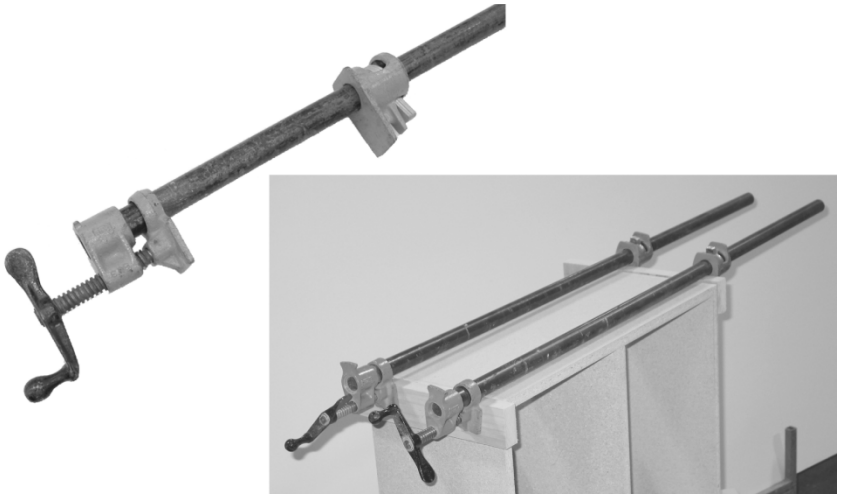


Figure 87 - Pipe clamp.

C-Clamps

As the name implies, this clamp has a C-shaped frame. It also has a screw and a handle at one end and a flattened jaw at the other (Figure 88). The size of a *C-clamp* is measured by the clear opening between the jaws and the depth of throat or frame. C-clamps are also load-classified as light duty or industrial. Because the vibration from machinery can loosen some types of clamps, c-clamps are recommended for use with machines, such as when using stop-blocks, jigs or hold-downs.

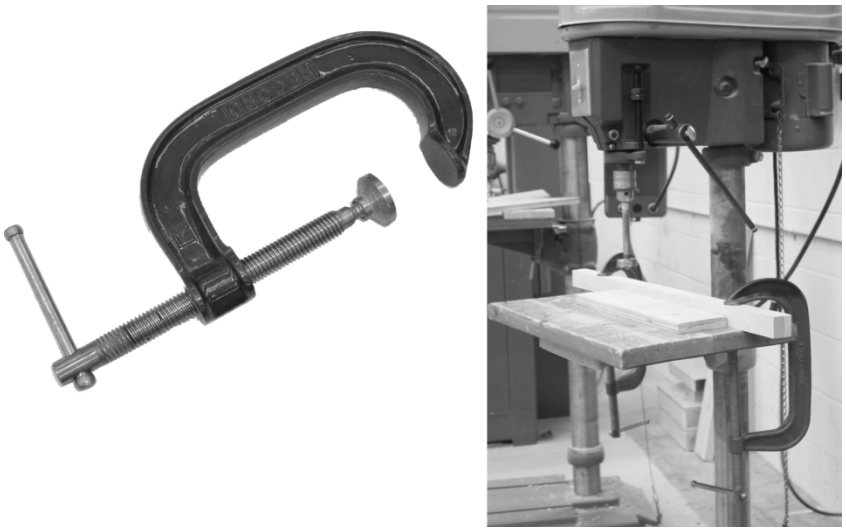


Figure 88 - C-clamp.

Spring Clamps

The *spring clamp* is used for small clamping jobs when light pressure is all that is needed (Figure 89).

Figure 89 - Spring clamp.

Hand Screw Clamps

The *hand screw clamp* is a traditional clamp with wooden jaws and is found in many woodworking shops. It consists of two rectangular jaws that can be adjusted by two threaded spindles to a variety of closing angles (Figure 90). This ability allows materials of unusual shape to be clamped in unusual positions and angles.

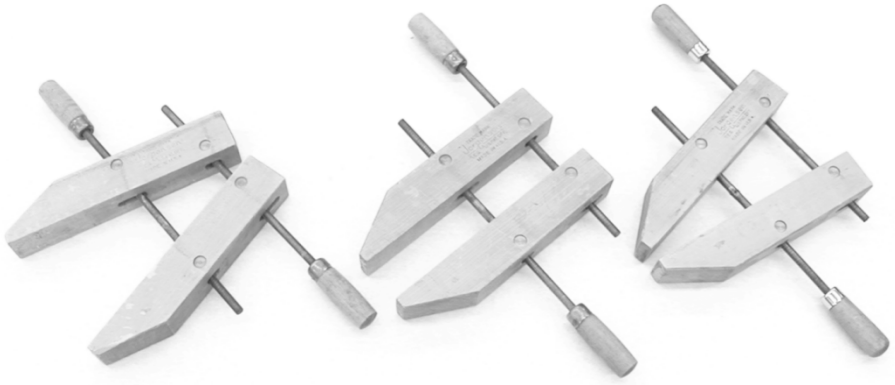


Figure 90 - Hand screw clamp.