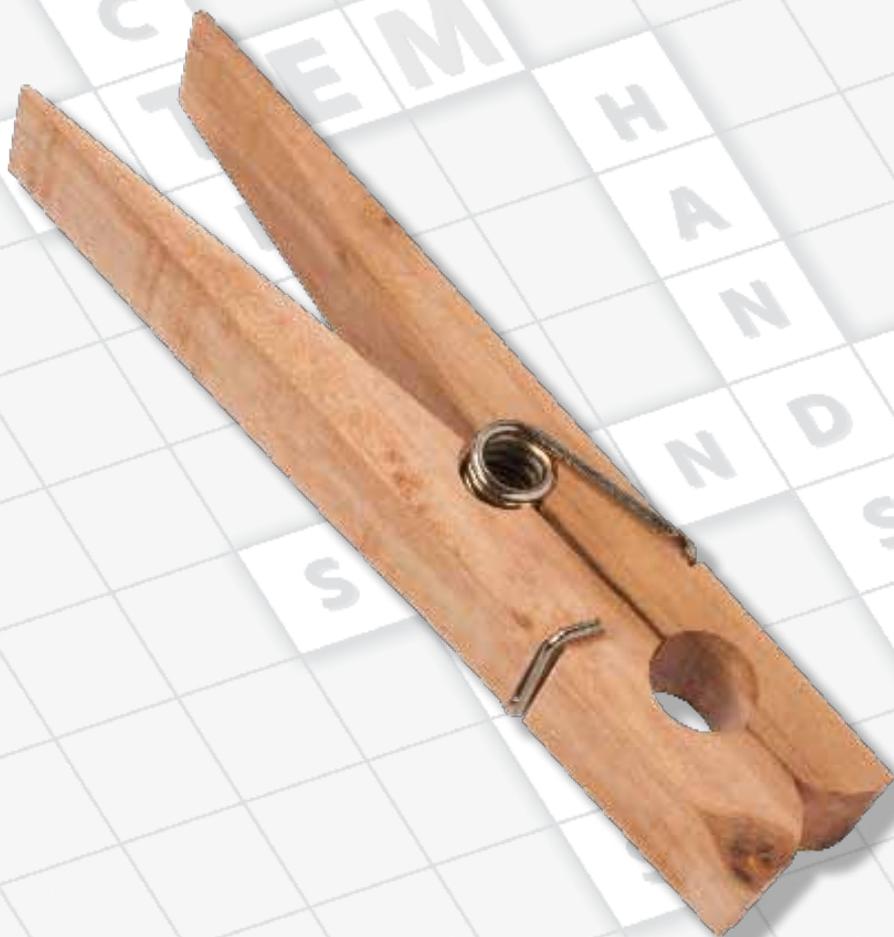


Super Clip



Contents of Kit

- Block of pine wood approximately 9" x 1-7/8" x 1-3/4"
- Clip spring

Tools and Materials You Will Need

- Try square
- Planer
- Backsaw or coping saw
- Awl
- Brace and auger bit
- Vise
- 150-grit sandpaper
- 220-grit sandpaper or emery cloth
- Paint, stain, or varnish
- Paint, stain, or varnish brush
- Primer, if paint is used as a finish
- Clean, soft rags
- Eye protectors
- Carbon paper
- 4/0 steel wool
- Light polishing oil
- Pencil



Learning Objective

By making the Super Clip, you will learn the fundamentals of woodworking and the uses of basic hand tools.

The Process

These are the steps you will use to change a block of wood into a Super Clip.

Step 1 Cut and plane the wood.

Step 2 Make and trace the clip pattern.

Step 3 Drill the holes.

Step 4 Cut the notches.

Step 5 Cut out and sand the clip.

Step 6 Apply the finish.

Step 7 Attach the spring.

Safety First

Safety is an important part of every job. Working with hand tools can be dangerous. It is important to respect the sharp edges and points of woodworking tools and to wear eye protectors when cutting, drilling, and chiseling. Always think safety.

Measuring Tools

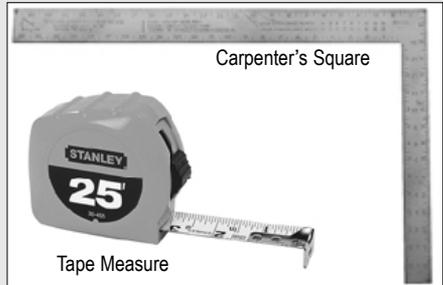
A *steel rule* is used to measure short distances and can also be used as a straightedge to test or draw straight lines.

Tape measures and *folding rules* are best for measuring longer distances.

Try squares, *combination squares*, and *carpenter's squares* are instruments used by carpenters for laying off right angles and for testing whether work is square.

Planes

Planes are carpenter's tools with an adjustable blade for smoothing and leveling wood. A plane's sharp blade is mounted in a handle at just the right angle. As it is pushed across a piece of wood, it scrapes thin slices from the surface.



Step 1:

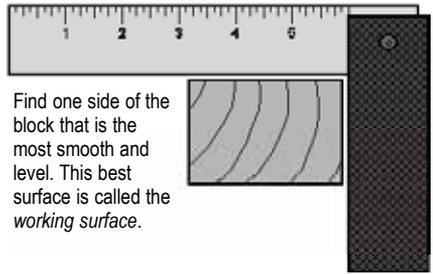
Cut and Plane the Wood Overview

All sides of the wooden block must be smoothed and reduced to its final dimensions of 1-1/8" (29 mm) thick and 1-5/8" (41 mm) wide.

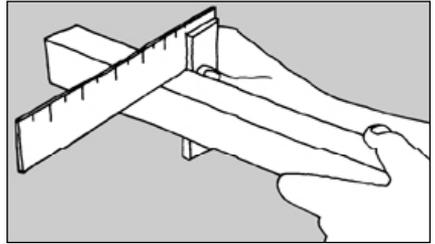
Use the try square to locate the smoothest side. The edge of the try square should sit flush against the wood. If none of the sides are smooth, use the plane to make one of the sides smooth and straight.

Place the try square along the block as shown. When the block is straight and true, it fits squarely into the corner with no gap or light showing through.

Also, the edges of the block should all form 90°, or right, angles. Put the block snugly into the corner of the try square to be sure that both sides are flush against the edges of the try square. If they are not, square them with a plane.



Find one side of the block that is the most smooth and level. This best surface is called the *working surface*.

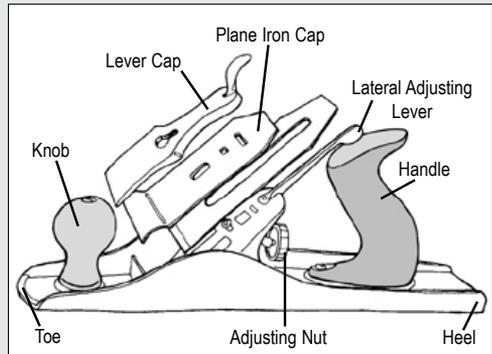


When two sides of the block fit flush against the try square, the sides form a right angle.

Types of Planes

Many types of wood planes are available. All wood planes are basically the same except for their size and the special kind of cut they make on the different wood surfaces.

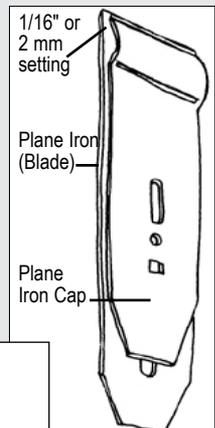
- The *block plane* and the *modeler* are small and used for fine work and for end-grain trimming.
- The *jack plane* is 11 to 15 inches long. It is used for all-around work and is the most popular plane.
- The *fore plane* and *jointer plane* are large planes. They are used to smooth long pieces of wood.



Assembling and Adjusting the Plane Iron

The illustration shows how the parts of a plane fit together. To adjust or sharpen the blade, remove the parts of the plane until you have the plane iron and the plane iron cap. If the plane iron needs to be sharpened, your instructor will explain how. The closer the plane iron cap is to the cutting edge, the thinner and finer the shavings. Ordinary work requires about a 1/16" or 2 mm setting.

Reassemble the plane and adjust the plane iron in the plane. The adjusting nut causes the plane iron to protrude through the hold (called the throat) in the bottom of the plane. Plane pieces of scrap wood to determine the setting you desire.

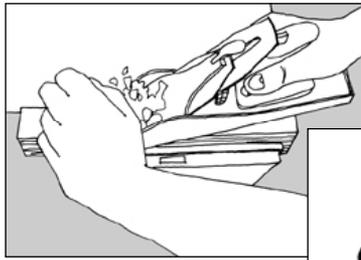


Safety First

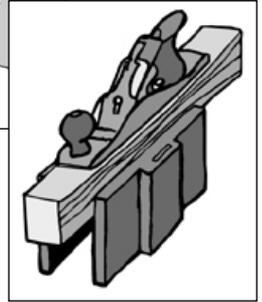
The plane iron (blade) should be adjusted and sharpened periodically. A dull tool is a dangerous tool and does poor quality work.

How to Plane

1. Place the wood in a vise so that it will not move. Raise the wood high enough so that you do not hit the vise as you plane the block.
2. Hold the plane level. As you begin to slide the plane along the wood, apply pressure on the front knob.
3. Always plane with or along the grain of the wood. Torn wood indicates planing against the wood, a dull blade, or wood grain that is twisted and knarled.

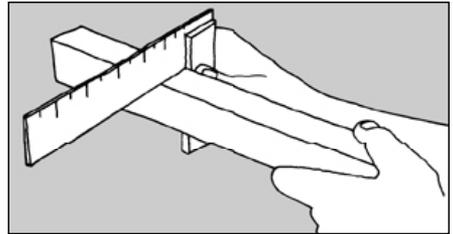


Place the wood in a vise.



Cut the Width and Thickness

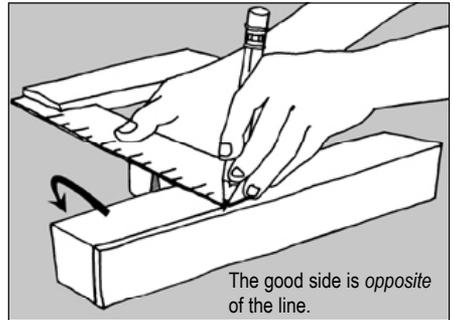
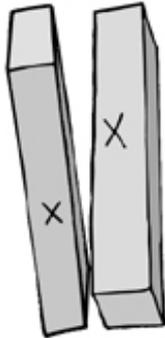
1. Plane one surface of the wood block straight and true – check with a try square. Using light pressure on a soft pencil, mark an X on this surface to identify it. It is called the *working surface*.
2. Use a rule to measure 1-1/8" (29 mm) from the working surface. Draw a line completely around the block.



Check for square. Plane out any bumps or dips on the wood surface.

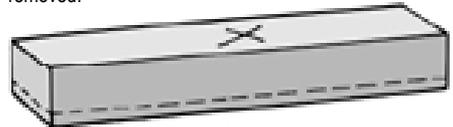
Check periodically to be sure that the sides form right angles to each other.

3. Cut the wood block down to size with a plane. When the wood is smooth and straight, mark it with an X. Two opposite sides of the wood block should now be smooth and straight and marked with an X.
4. Determine the better of the remaining two sides. Use the plane to smooth and straighten the third side and mark it with an X when completed.



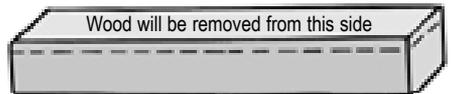
The good side is *opposite* of the line.

From the good side, measure and draw a line around the wood to show the amount of wood that needs to be removed.



Make an X on the working surface.

5. Measure 1-5/8" (41 mm) from the third side and draw a line around the block. Using a plane, remove the wood until the surface is equal with the line. Mark this final side with an X.
6. Check your block. It should:
 - Be 1-1/8" (29 mm) thick by 1-5/8" (41 mm) wide.
 - Be free of bumps or dips.
 - Have sides that form 90° angles.

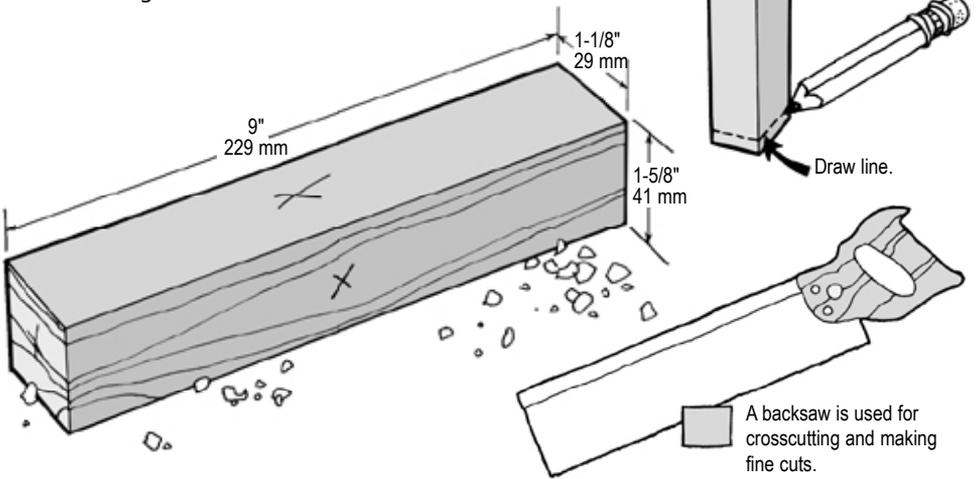


Working Surface



Cut the Length

1. Measure the length of the wood block. If it is longer than 9" (229 mm), follow Steps 2 through 4 to cut off the excess length.
2. Look at the two ends of the wood block. Mark the smoother end with an X.
3. Measure and mark the correct length (9" or 229 mm) by drawing a line around the wood.
4. Using the backsaw or a coping saw, cut the wood to the correct length.



Saws

Saws are used to alter pieces of wood by cutting. They are designed to cut on the push stroke. The teeth of a saw blade chip out little pieces of wood until a cut is made through the board. These little chips of wood that a saw removes are the sawdust that is left after using a saw.

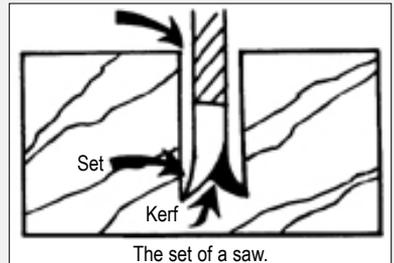
Types of Hand Saws

Many different saws are available for different woodworking chores.

- A *backsaw* is used for crosscutting and making fine cuts.
- A *coping saw* has a very thin blade and tiny teeth. It is used to make curved cuts.
- A *ripsaw* is designed to cut with the wood grain.
- A *crosscut saw* is made to cut across the grain.

The Set of a Saw

The teeth of all saws curve to the outside. Thus, the cut into the wood is wider than the metal thickness of the saw. This allows the saw to move freely without binding.



Step 2: Make and Trace the Pattern

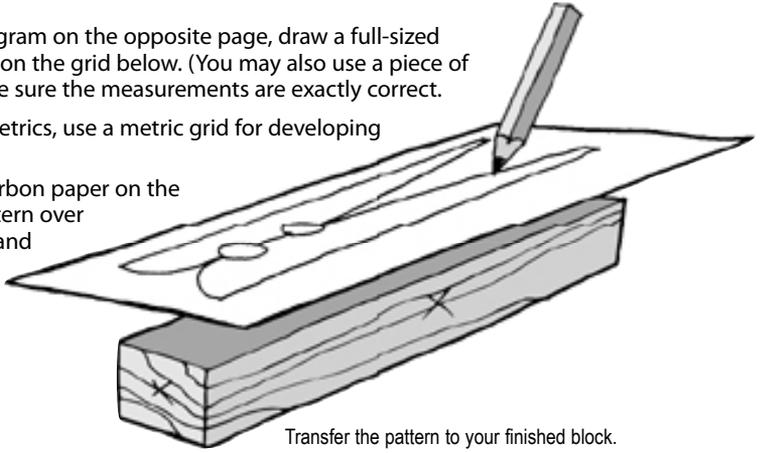
With the wood block squared and cut to the proper dimensions, it is time to cut out the clip. The clip seems to emerge from inside the wood as the outer pieces are removed.

Draw the Pattern

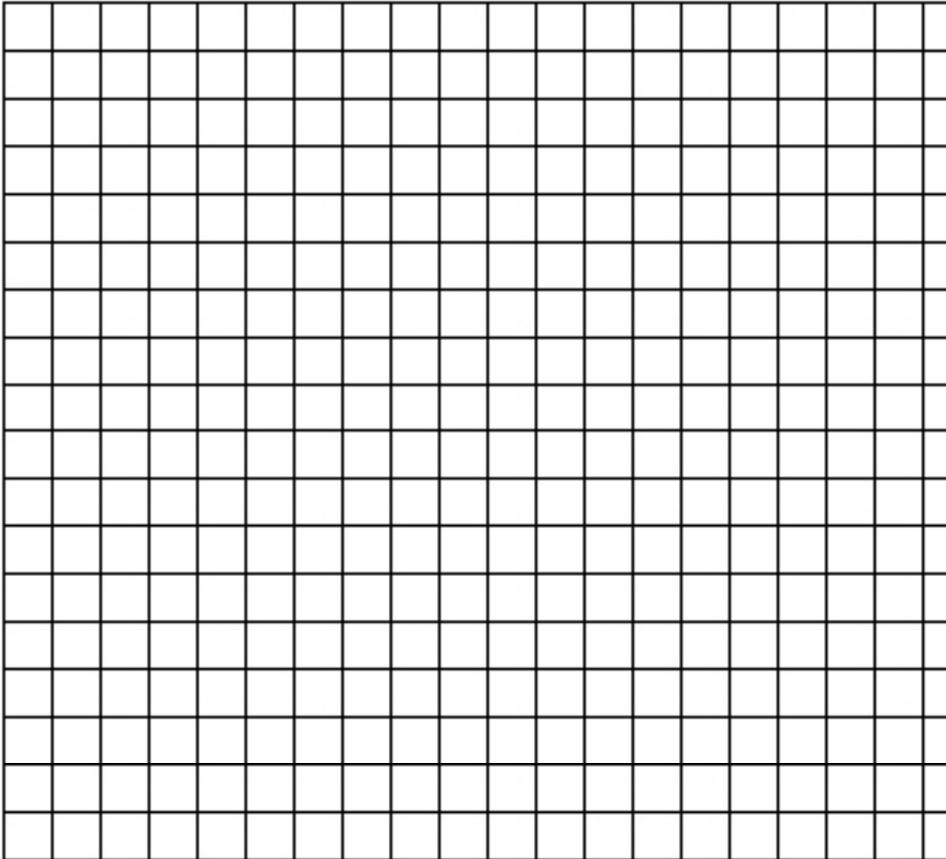
1. Guided by the diagram on the opposite page, draw a full-sized pattern of the clip on the grid below. (You may also use a piece of graph paper.) Make sure the measurements are exactly correct.

Note: If you use metrics, use a metric grid for developing your pattern.

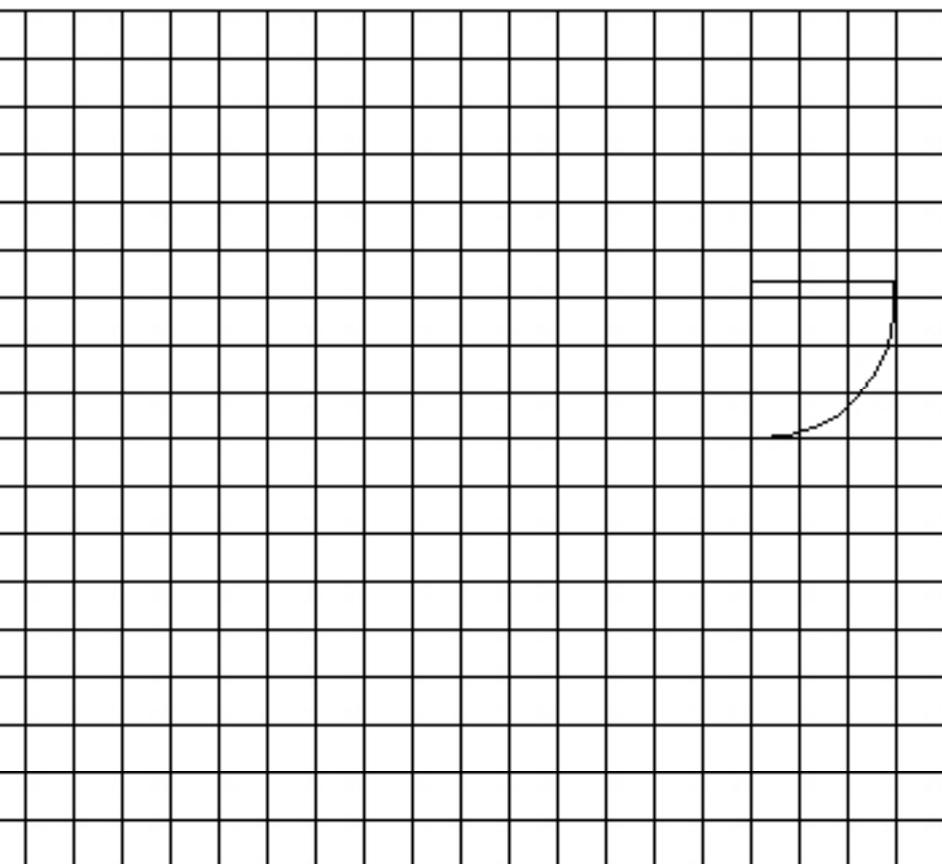
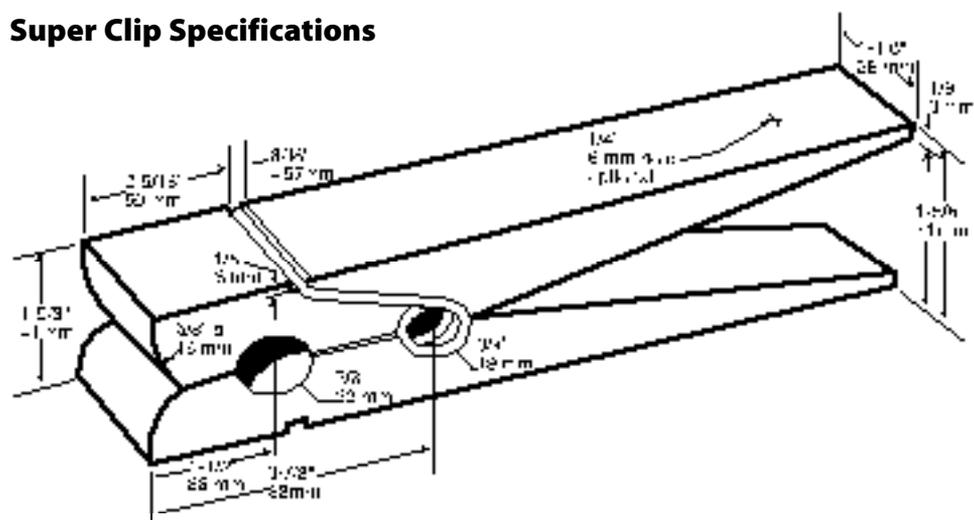
2. Place a piece of carbon paper on the wood. Put the pattern over the carbon paper and trace the pattern. Use a straight edge to make the lines straight.



Transfer the pattern to your finished block.



Super Clip Specifications



Step 3:

Drill the Holes

1. Put the wood into a vise to hold it securely.
2. Using a sharp awl, punch a hole in the center of the holes marked on the wood.
3. Put the drill bit into the punched hole and drill out the holes using the technique described below.

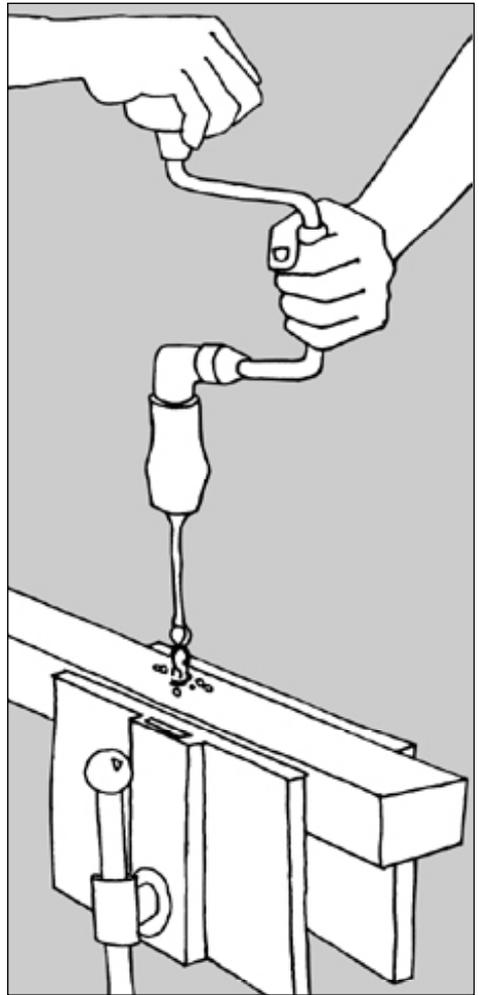
Brace and Bit

A brace is used to hold an auger bit and to provide needed leverage for boring holes.

When drilling, hold the brace and bit straight (perpendicular) to the wood. Place your hand on the top knob and use only enough pressure to keep the drill bit in place and to cut. Too much pressure produces a sloppy job and makes drilling difficult.

To ensure a smooth hole when the bit cuts through the wood, stop drilling when the screw end breaks the surface on the opposite side of the wood.

Then, complete the boring of the hole by drilling back from the other side.

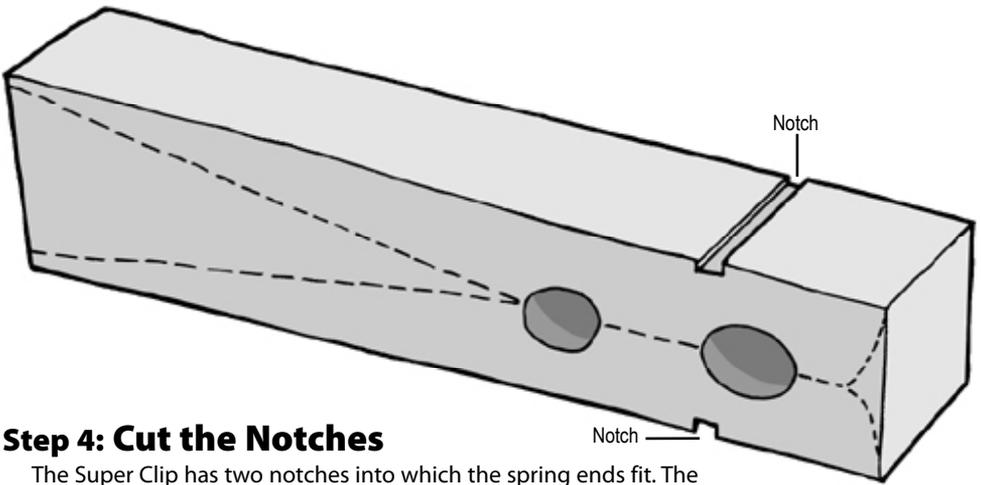


Easy does it when drilling a hole. Gentle pressure works best.

Auger Bit

Holes are drilled in wood and other soft materials using auger bits. The size of the bit is marked on the tang in sixteenths of an inch.





Step 4: Cut the Notches

The Super Clip has two notches into which the spring ends fit. The notches are made with a backsaw, hammer, and chisel.

1. Using measurements from the Super Clip Specifications diagram on page 7, draw lines across the wood to indicate the location of the notches. Be sure the measurements are correct and accurate.
2. Clamp the wood block into a vise to hold it securely. With a backsaw, cut on the waste side (inside) of each line. *Do not cut deeper than 1/8" or 3 mm!*
3. When the notches are cut, use a chisel to remove the wood between the saw cuts.

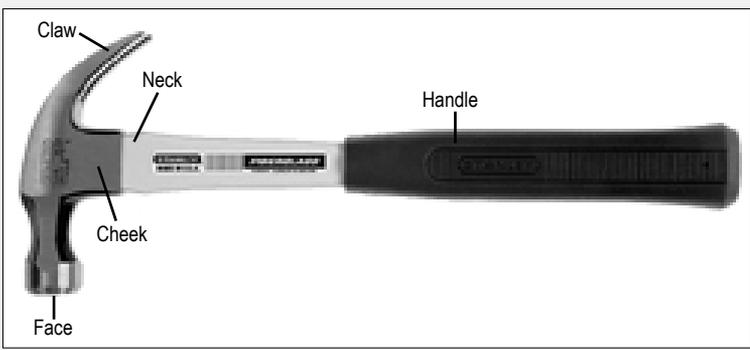
Chisel

Chisels are used to remove wood from grooves. Always push away from you when using a chisel.



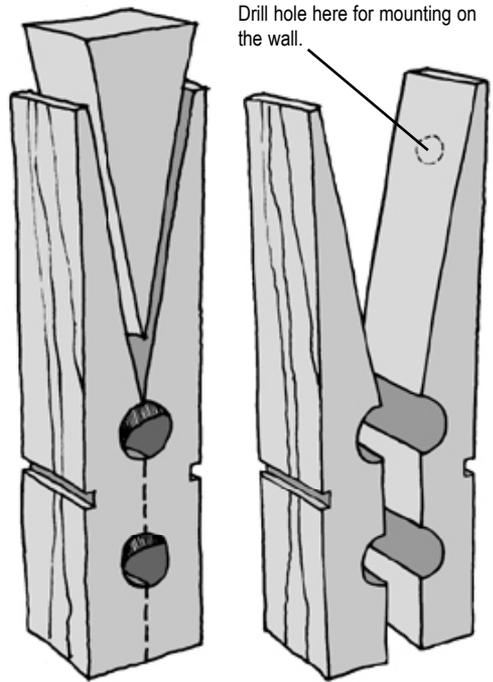
Hammer

Driving nails into wood or removing nails are the chief uses of hammers. Hammers and mallets are also sometimes used with chisels to remove wood.



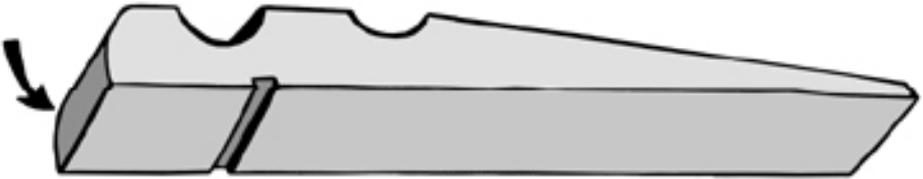
Step 5: Cut Out and Sand the Clip

1. Use a handsaw to cut out the V shape of the clip.
2. Cut all the way through the clip to separate the two sides.
3. Drill a hole for mounting the clip on a wall, if desired.
4. Round the ends of the clip and smooth the wood. Start with 150-grit sandpaper to remove lumps or nicks. When the surface is basically quite smooth and even, use 220-grit sandpaper or an emery cloth to polish the surface. The surface should be flawless before applying a finish.



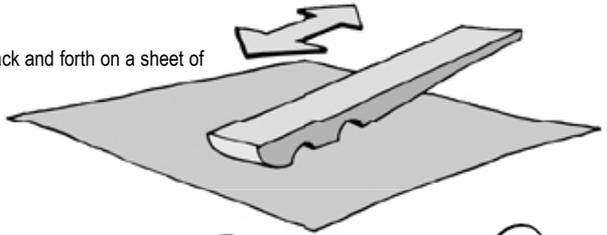
Cut the V shape of the clip.

Separate the two sides.



Round the edges of the clip.

Sand first by moving the sides of the clips back and forth on a sheet of 100- to 150-grit sandpaper



Step 6: Apply the Finish

The clip can be finished by staining, painting, or varnishing it – your choice.

Stain colors the wood but still allows the wood grain to show through. Paint completely covers and colors the wood. Varnish gives a clear finish that protects the wood. Varnished wood appears dark as though it were wet.



Applying Stain

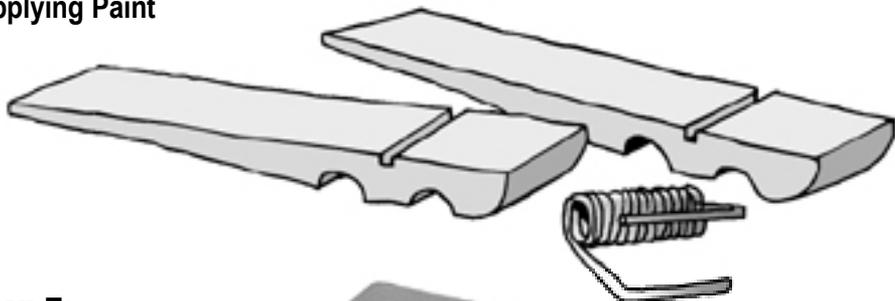
1. Clean all dirt and sawdust from the clip.
2. Thoroughly stir the stain. The pigment in wood stains settles to the bottom rapidly; therefore, the stain should be stirred just before you use it.
3. Apply the stain with a brush or rag. Allow it to soak into the wood and then wipe off the excess stain with a clean rag.
4. If desired, you may apply varnish after the stain has dried.

1. Using a brush, paint the wood with a wood sealer, such as a primer.
2. Let the sealer dry completely and then lightly sand the clip with extra-fine sandpaper.
3. Apply the second coat of paint and let it dry overnight in a dust-free room.

Applying Varnish

1. Using a brush, apply the varnish to the wood. Let the varnish dry overnight in a dust-free room.
2. Repeat Step 1 for the second coat.

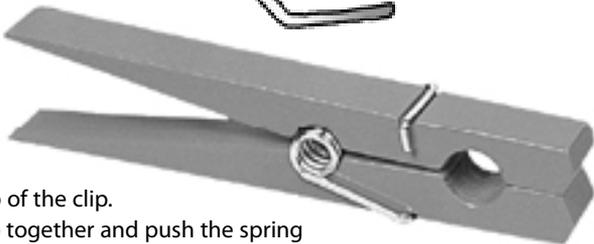
Applying Paint



Step 7:

Attach the Spring

1. Hold the sides of the clip together with the notches out. Pinch the top ends together.
2. Slip the metal spring over the top of the clip.
3. Pinch the bottom ends of the clip together and push the spring down until the coil rests in the drilled hole and the braces fit into the notches.
4. Rub the clip down with 4/0 steel wool and a light oil. Polish with a soft cloth.



Discussion Questions

1. How long did it take you to make your Super Clip?
2. How would you rate your craftsmanship?
3. What will you do differently if you make another clip?
4. If you had to produce 50 Super Clips, what would you do?
5. How do you plan to use your clip?



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