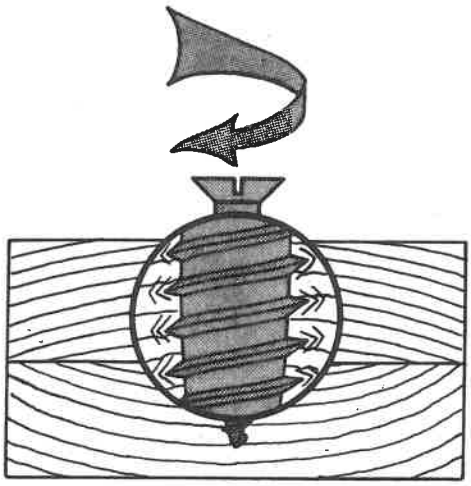
CHAPTER 34

Installing Screws

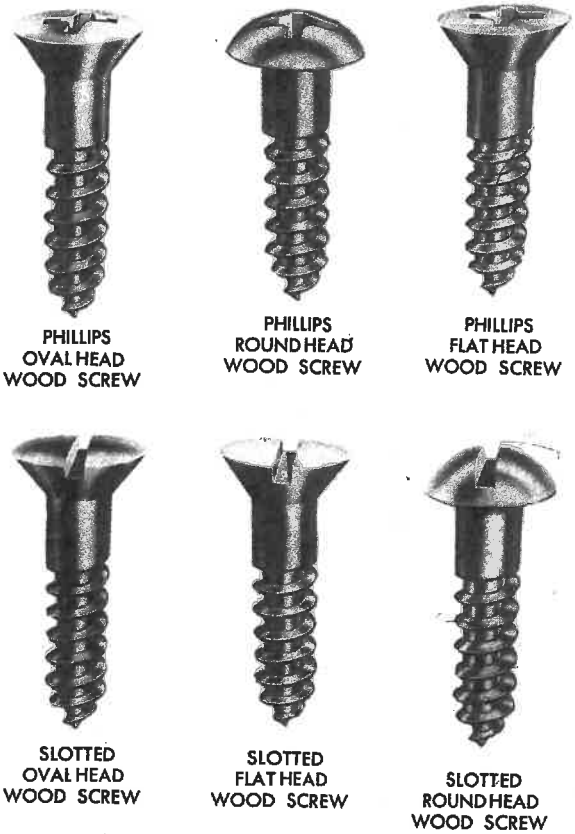
A *screw* is a fastener with a groove twisting around part of its length. It is one of the best wood fasteners. A screw is strong. It does not come out easily. It can be tightened and later loosened to take an article apart. Fig. 34-1.

TOOLS AND MATERIALS

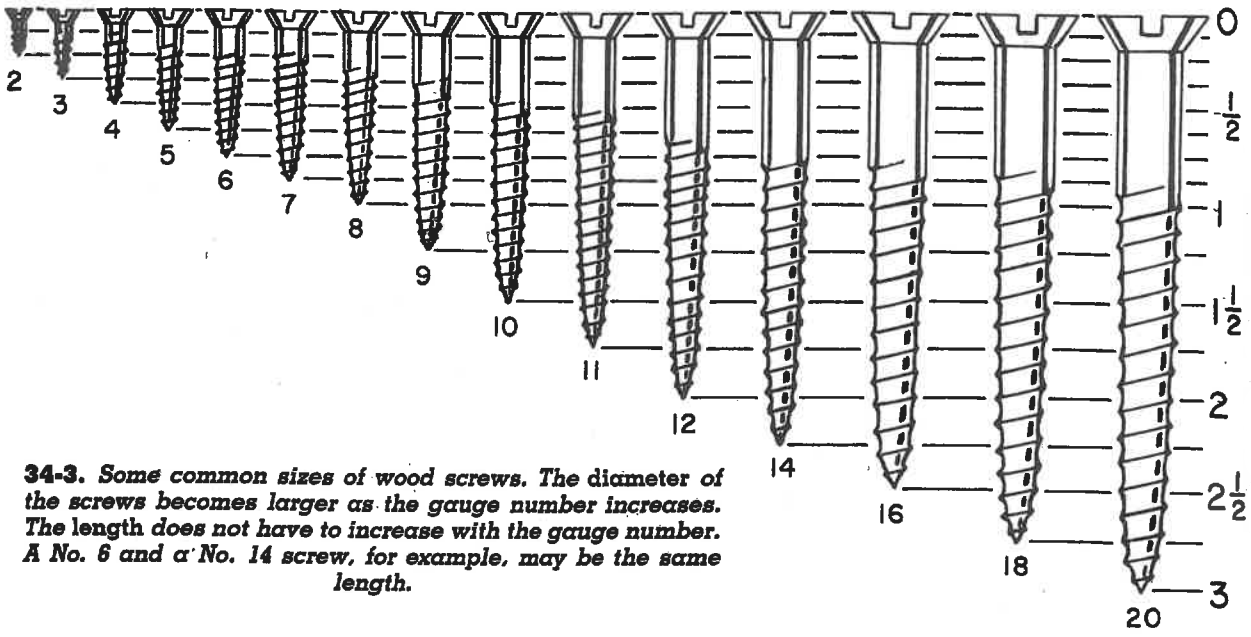
Wood screws are made of mild steel, brass, aluminum, or copper. Brass screws are used for boats, water skis, or other projects used around water. The most common head shapes are *round, flat,* and *oval.* Fig. 34-2. Roundhead screws of mild steel are made with a blue finish. Flathead screws of mild steel have a bright finish. Ovalhead screws are usually plated with cadmium or chromium and are used most often to install hinges, hooks, and other hardware. Most screws have a plain *slotted* head. However, the *recessed* (Phillips) head is becoming more popular.



34-1. ***A wood screw is the most efficient device for holding pieces together. A force applied to the head causes the screw to move into the wood. One complete turn of the screw moves it straight into the wood by an amount equal to the distance from the top of one thread to the top of the next. The thread itself is an inclined plane.***



34-2. ***Common head shapes and types of slots.***



34-3. ***Some common sizes of wood screws. The diameter of the screws becomes larger as the gauge number increases. The length does not have to increase with the gauge number. A No. 6 and a No. 14 screw, for example, may be the same length.***

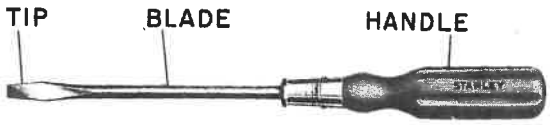
Screws come in different lengths from ¼ inch to 6 inches. They also come in different gauge sizes from 0 to 24. The gauge tells the diameter. The larger the gauge number, the greater the diameter of the screw. Screws of the same length come in different gauge sizes. For example, a No. 6 screw, 1½ inches long, is a very slim screw, while a No. 14 screw, 1½ inches long, is a fat screw. Fig. 34-3. Generally the lower gauge numbers are used for thin wood and the higher numbers for heavy wood.

Screws are sold by the dozen or by the hundred in hardware stores. They are packed in factories by the pound.

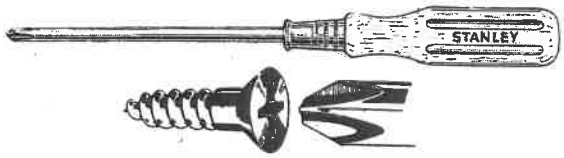
The five most common sizes of flathead screws are:

- No. 7: ¾ inch long.
- No. 8: 1 inch long.
- No. 8: 1¼ inch long.
- No. 10: 1¼ inch long.
- No. 12: 1½ inch long.

There are two types of screwdrivers. The *plain* screwdriver is used to install slotted-head screws. The size depends on the length and diameter of the blade. Fig. 34-4. The *Phillips-head* screwdriver is also made in different diameters and lengths. It is used to install Phillips-head screws. Fig. 34-5. Its tip cannot be reshaped.



34-4. ***A plain screwdriver.***



34-5. ***A Phillips-head screwdriver. (Stanley Tools)***

An *82-degree countersink* is needed for flathead screws that must be flush with the surface. This tool makes a cone-shaped hole for the head of the screw to go into. Fig. 34-6.

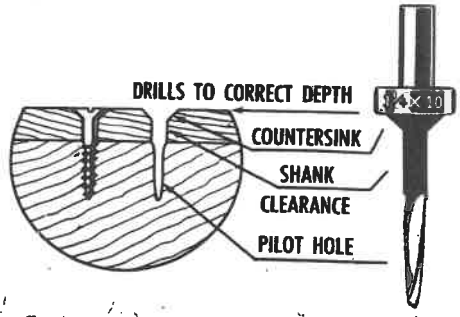
34-6. ***A countersink for a brace (left) and for a hand drill or drill press (right). (Stanley Tools)***

34-7. ***Screwdriver bit to be used in a brace. (Stanley Tools)***

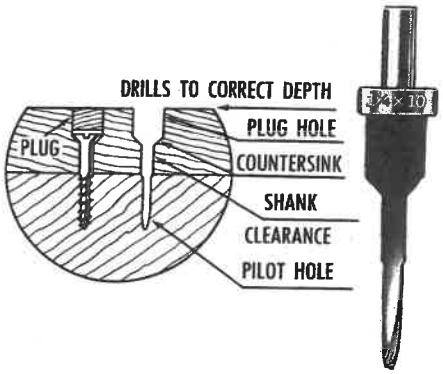
A *screwdriver bit* can be used in a brace for setting screws. Fig. 34-7.

A *screw-mate drill and countersink* is a tool for installing flathead screws. Fig. 34-8. It will do four things at once: drill the hole to correct depth, countersink, make the correct shank clearance, and make the correct pilot hole. This tool is stamped with the length and gauge number. For example, a ¾" × #6 is used for a flathead screw ¾ inch long and No. 6 gauge size.

A *counterbore* will do all the operations performed by the screw mate, plus drilling plug holes for wooden plugs. Fig. 34-9.



34-8. ***A screw-mate drill and countersink to use with flathead screws. (Stanley Tools)***



34-9. ***A screw-mate counterbore which does five things at once. A wood plug can be used to cover the screwhead. (Stanley Tools)***

INSTALLING SCREWS

1. Choose a screw long enough to go two-thirds its length into the second piece of wood. Another rule to follow is to make sure that all the threaded part of the screw will go into the second piece. The diameter of the screw should be chosen according to the thickness of the wood.

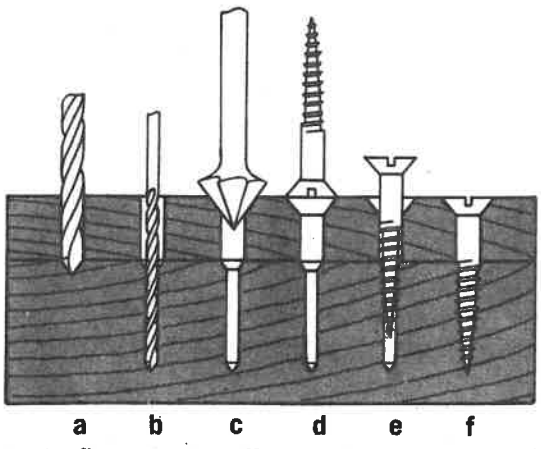
2. Mark the location of the screw hole in the first piece of wood. Make a punch mark with a center punch or scratch awl.

3. Select a drill that will be equal in diameter to the shank of the screw and drill a shank hole in the first piece. The table in Fig. 34-10 shows the correct drill size. You can also hold the drill behind the screw shank and sight for size.

DRILL SIZES FOR WOOD SCREWS

Screw Gauge No.	0	1	2	3	4	5	6	7	8	9	10	11	12	14	16	18	20
Shank Hole Hard & Soft Wood	1/16	5/64	3/32	7/64	7/64	1/8	9/64	5/32	11/64	3/16	3/16	13/64	7/32	1/4	17/64	19/64	21/64
Pilot Hole Soft Wood	1/64	1/32	1/32	3/64	3/64	1/16	1/16	1/16	5/64	5/64	3/32	3/32	7/64	7/64	9/64	9/64	11/64
Pilot Hole Hard Wood	1/32	1/32	3/64	1/16	1/16	5/64	5/64	3/32	3/32	7/64	7/64	1/8	1/8	9/64	5/32	3/16	13/64
Auger Bit Sizes for Plug Hole			3	4	4	4	5	5	6	6	6	7	7	8	9	10	11

34-10. ***This table shows the drill sizes to use for various gauges of screws.***



34-11. ***Steps in installing a flathead screw: (a) Drill the shank hole. (b) Drill the pilot, or anchor, hole. (c) Countersink. (d) Check the amount of countersink with the screwhead. (e) Install the flathead screw. (f) Screw properly installed.***

4. Place the first piece of wood over the second. Mark the location of the screw hole in the second piece.

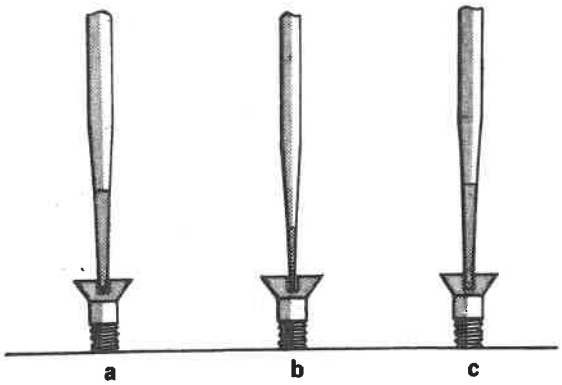
5. Drill a pilot hole (anchor hole) to the depth the screw will go. If the wood is very soft, this hole may not be needed. The drill for the pilot hole must be about equal to the smallest diameter of the threaded part of the screw. Here again you can use a chart or sight for size. Use a depth or bit gauge if several screws must be installed.

6. When using flathead screws, cut a conical (cone-shaped) hole with a countersink so that the head of the screw will be flush with the surface. To check, turn the screw upside down and see if the hole is just right. Fig. 34-11. If you are installing many screws of the same size, put a depth or bit gauge on the countersink.

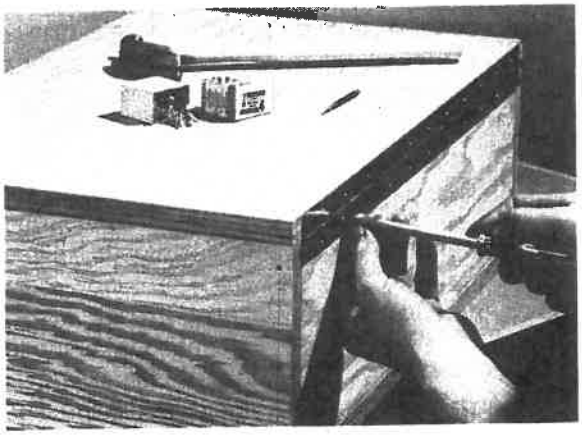
7. The blade of a plain screwdriver should be equal to the width of the screwhead. A screwdriver that is too small will slip and make a *burr* (a rough edge) on the screwhead. A screwdriver that is too large will mar the wood as you finish tightening the screw. The tool should be ground so that it has a straight, square blade. Fig. 34-12.

8. Hold the screw between your thumb and forefinger. Hold the handle of the screwdriver lightly in your other hand. Start the screw. Then slip the hand holding the screw up behind the tip of the screwdriver to guide the tool as you tighten the screw. Fig. 34-13.

9. Don't try to tighten the screw too much. You may break the screw or strip the threads in the wood, and the fastener won't hold. You must be especially careful with aluminum or brass screws.



34-12. *Incorrect and correct way of grinding a screwdriver for slotted-head screws: (a) Tip rounded. (b) Tip too thin. (c) Tip properly fitted.*



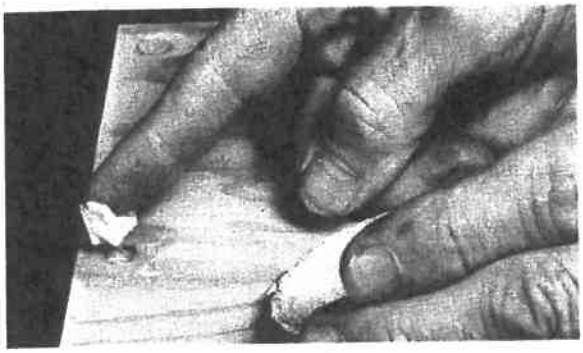
34-13. *Starting to drive a screw. Note that the screwdriver is guided with the thumb and forefinger.*

10. If several screws are used to fasten two parts together, it is a good idea first to drill all the shank holes (and countersink). Then drill one pilot hole and install the screw before drilling the other pilot holes. This makes it easier to line up the parts to be put together.

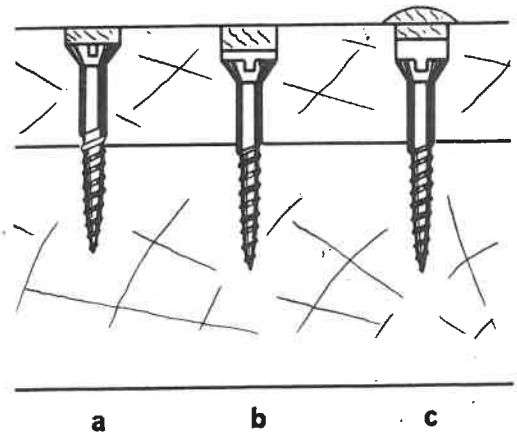
11. In driving a large number of screws, a screwdriver bit may be used in a brace to speed the work.

CONCEALING THE SCREWHEAD

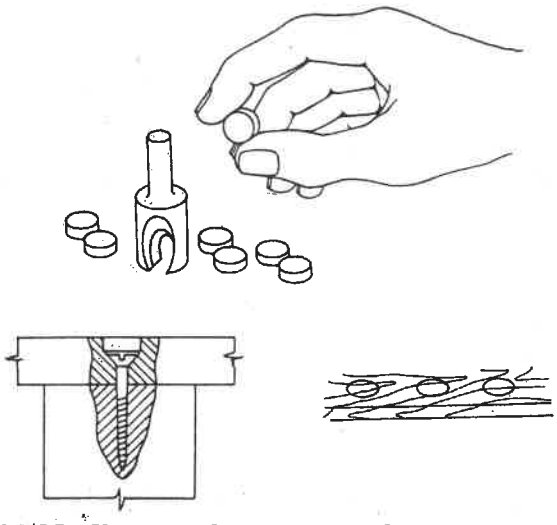
On some projects you don't want the screwhead to show. As a first step, bore a shallow hole with an auger bit that is the same diameter as the screwhead. Then, after the screw is set, you can cover the screw with plastic wood or a plug. Figs. 34-14 and 34-15. A plain plug or button (small wood covering) can be cut on the drill press, or a decorative plug can be bought. Fig. 34-16.



34-14. *Screws can be countersunk and the hole filled with plastic wood. Remember when adding a filler to apply it so that it is slightly higher than the wood. Sand it off level after it is dry.*



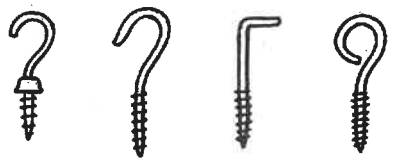
34-15. *Three methods of covering the heads of screws: (a) Plastic wood. (b) A plain wood plug. (c) A fancy wood plug.*



34-16. ***If you make a project where screws are countersunk or counterbored, it will pay to use a plug cutter. This tool cuts perfect plugs from the same stock used for the project. Plug cutters are made in sizes 6, 8, 10, and 12 to match the commonly used screw sizes. The plugs are a snug fit in the counterbored holes.***

HOUSEHOLD SCREW DEVICES

Figure 34-17 shows some of the common household screw devices. Common sizes of *cup hooks* (usually made of brass) are ½, ⅝, ¾, 1, 1¼ and 1½ inch. *Screw hooks* are made in lengths from 1¼ to 2½ inches. *"L" (square-bent) screw hooks* are available in lengths from 1 inch to 2¼ inches. *Screw eyes* are made with either small or medium eyes in many different sizes.



34-17. ***These devices are often used around the home. For example, cup hooks are installed under kitchen cabinet shelves to hold cups.***

QUESTIONS

1. Why is a screw better than a nail?
2. Name three of the materials from which screws are made.
3. What are the three most common head shapes?
4. Which is larger in diameter, a No. 4 or a No. 10 screw?
5. Name the most common sizes of flathead screws.
6. When is an 82-degree countersink needed?
7. How do you choose the correct size screw?
8. What is a shank hole?
9. What is a pilot, or anchor, hole?
10. ~~Tell how to install a screw.~~
11. How can you hide the heads of screws?