

## Lesson 13: Drills and Fasteners

### Introduction

Drills and fasteners are essential in woodworking and construction. Drills create holes and drive fasteners, while screws, nails, and hinges secure materials together. Understanding the types of drills and fasteners, their uses, and proper application is key to building durable and functional projects.



### Drills

Drills excel at making round holes in a material, like wood, or for driving fasteners, like screws. Most drills achieve this by rotating a drill or driver bit quickly when you press the trigger. Available in manual, corded, battery-powered, or pneumatic variants, drills are essential in various professional fields.

Carpenters, electricians, auto mechanics, and plumbers often rely on these versatile power tools, while many DIY enthusiasts keep one handy for tasks like hanging a TV or running wires.

### Types of Drills

#### Hand drills

Are versatile tools used to create holes in materials like wood, plastic, and soft metals by rotating a drill bit with a harder material, and they can also drive screws with the appropriate driver bit. They offer professionals and DIYers complete control, making them suitable for detailed work and various tasks in carpentry, assembly, and maintenance.



## Drill Press

A drill press is a stationary power tool common in woodworking and metalworking shops. Its large body hangs over a built-in table where the target material can be clamped to prevent it from moving while you work.

The drill bit plunges vertically down through the material to drill highly accurate holes that are difficult to achieve with a handheld drill. Not only are the drill holes accurate, but they are also repeatable. So, you can drill the same hole in the same location on several different pieces of wood or metal without needing to readjust the position of the drill bit.



## Power Drill

A power drill is a versatile tool primarily used for drilling holes and driving screws. It can also be used for sanding, buffing, and other tasks with the right attachments. Cordless drills are particularly popular for their convenience and portability, while corded drills offer more consistent power.



## Fasteners

The term "***fasteners***" encompasses a fairly broad category of tools, such as screws, nuts, and bolts, that share a common purpose: to hold objects together mechanically. Of course, things like glue can fulfill this function, but glue is not a type of fastener. Therefore, we need to add to our definition. Hardware fasteners mechanically hold objects together.

Typically, fasteners form a non-permanent joint. In other words, when you use a fastener to connect two components, you can remove it, and the separate pieces should come apart without suffering any damage. The same wouldn't be the case with a welded joint, for instance. The one exception to this rule is rivets, which fall under the category of fasteners but create permanent joints.

## 1. Screws

For many people, when they think of fasteners, screws are the first thing to come to mind. Screw fasteners are one of the most versatile types of fasteners out there. Their threaded shafts give them durable holding power, and unlike a bolt, they don't require anything to hold them in place. Typically, you use a drill to make a pilot hole in a material and then use a screwdriver to drive the screw in place. Screws come in a wide variety of types and sizes. Some of the most common types of screws include:



- **Wood screws** have coarse threads and a tapered head.
- **Deck screws** are similar to wood screws, but include self-tapping designs and corrosion resistance for outdoor applications.
- **Drywall screws** feature a self-tapping head that can countersink without causing damage to drywall.
- **Sheet metal screws** have sharper threads for connecting metal to other materials.
- **Machine screws** have a uniform thickness and don't taper off at the bottom.
- **Masonry Screws** A masonry screw is specially designed to cut into concrete and brick. A drywall screw has twin threads to allow for quick, easy installation.
- **Board screw** This is designed specifically for wood or wood-type materials such as MDF or fibre board. They are self-tapping in as much as they will tap their own threads and do not need to be used with a pre threaded insert. It has a sharp point for easy starting and holds a grip within the wood so it will not slip.
- **Exterior screw** This is treated with an anti-rust coating to prevent corrosion or rust and is ideal for decking, joists or fences.

## 2.Nails

Nails have been used since ancient times, and they are still an everyday household item. You can easily spot the difference between a screw and a nail because a nail doesn't have threading. While a nail doesn't provide the same holding power a screw does, it has greater shear strength, making it the better choice for some applications.

Many types of nails take their names from their applications, which can make it a snap to find the right variety of nail for a job. They typically have specific characteristics designed for working with the materials or application at hand. Some common kinds of nails include the following:



- **Common nails** have a thicker shank for greater holding power for many different applications, but the thick head will be visible on most projects.
- **Box nails** offer easier driving with a steel construction and diamond-point tip.
- Brad nails can easily blend into wood trim.
- **Finishing nails** are for more detailed work and have a small, flat head designed to blend in with project finishes, such as those on crown molding.
- **Drywall nails** are designed for easy concealment and reduced slippage.
- **Flooring nails** are designed for use with various flooring materials.
- **Framing nails** can include a variety of styles, often designed for flush installation and easy concealment.
- **Roofing nails** have a wide head and are often corrosion-resistant.

### 3.Hinges

are essential pieces of flexible hardware that attach doors, gates, lids, or other swinging parts to a frame, allowing for opening and closing. Although many hinges look similar, several types may be better suited for certain applications. Choosing the perfect hinges for your project depends on where you'll install them and the finished look you're trying to achieve. In our guide, we'll explain the different types of hinges and how they're used.



#### Butt Hinge

The most common type of hinge used on doors is the butt hinge. It's so named because the two leaves are mortised into the door and frame, allowing the two to butt up to each other. A pin, that may or may not be removable, joins the two leaves (or plates) at the hinge's knuckles. There are three different types of butt hinges—plain, ball bearing, and spring-loaded. Builders generally use plain butt hinges for lightweight interior doors.

#### Ball Bearing Hinge

The ball bearing hinge has lubricated bearings between the hinge's knuckles to reduce friction caused by heavy doors. These durable hinges are ideal for heavy entryway doors or for doors that are in frequent use.

#### Spring-Loaded Butt Hinge

To assure a door closes behind you, use a spring-loaded butt hinge. These hinges resemble the butt hinge, but they typically have a spring attached to the pin. This ensures that doors—usually screen doors—will close automatically. You can also calibrate these hinges to open or close with varying degrees of tension.

### **Rising Butt Hinge**

A rising butt hinge raises the door 1/2-inch to clear a thick-pile carpet or threshold. When closed, it looks like a regular hinge. A rising butt hinge is best if you have a thick floor covering, such as a carpet, or a jamb that prevents standard doors from easily opening and closing.

### **Barrel Hinge**

For specialty woodworking projects, like a box or small cabinet, use the barrel hinge. This small hinge is ideal for projects where you want the hinge concealed from view. To install, drill holes that will accommodate the barrels and insert the hinge. Typically made of brass, barrel hinges are not designed for load-bearing applications.

### **Concealed Hinge**

Designed not to be seen, concealed hinges don't detract from the beauty of fine furniture or cabinetry. These invisible hinges can be self-closing, and they can also be adjusted with the aid of a couple screws. You can find larger concealed hinges for doors. Since they aren't exposed when the door is in a closed position—and are therefore tamper-proof—these can provide security that regular hinges don't.

### **Knife (Pivot) Hinge**

You'll find knife hinges in cabinets. Also called pivot hinges, they resemble the blades of a pair of scissors, attached at a pivot point. One hinge leaf is mortised into the end of the cabinet door and the other hinge leaf is mortised into the cabinet. Once installed, all that's exposed is the pivot.

Another type of pivot hinge allows doors to pivot open and closed both ways, much like the kitchen doors you see in restaurants. These spring-loaded hinges are larger and heavier than those made for cabinetry.

### **Overlay Hinge**

Some hinges add thickness to the cabinetry. To reduce that thickness, consider the overlay hinge. This type of hinge folds back on itself, allowing the door to lie flush against the face of the cabinet.

### **Offset Hinge**

Have you ever tried to move a couch through a doorway, only to find that the doorway is half an inch too narrow? That's where an offset hinge helps. This specialty hinge allows you to swing the door away from the doorframe, widening the opening up to 2 inches. Offset hinges are especially useful for areas you want to make compliant with the Americans with Disabilities Act (ADA).



### **Piano Hinge**

The long, continuous piano hinge is named for the hinge on a piano's lid. A long rod runs through the knuckles of this hinge's two long leaves, holding it together. It's the perfect hinge choice for toy boxes, fold-down desks, and storage benches.

### **Strap Hinge**

You'll often find heavy-duty strap hinges outside on gates. Inside, designers use smaller versions of strap hinges on cabinets to achieve a rustic feel. The long hinge leaves (or straps) add extra support for heavy gates or barn doors.

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### **Terminologies**

1. **Chuck** – The part of a drill that holds the drill bit.
  2. **Drill Bit** – A cutting tool used with drills to create holes.
  3. **Torque** – Rotational force produced by a drill.
  4. **Countersink** – A conical hole made to allow a screw head to sit flush with the surface.
  5. **Pilot Hole** – A small hole drilled to guide screws or nails, preventing splitting.
  6. **Fastener** – A hardware device that mechanically joins materials together.
  7. **Thread** – Spiral ridge on screws that helps them grip into wood or other materials.
  8. **Shank** – The smooth part of a nail below the head.
  9. **Butt Hinge** – A common hinge with two rectangular plates joined by a pin.
  10. **Concealed Hinge** – A hinge hidden within furniture for a seamless look.
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