

Basic Machining

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In this paper I will explain how to use the drill press, the different types of drill bits, the chop saw, the belt/disc sander, and the different types of screwdrivers.

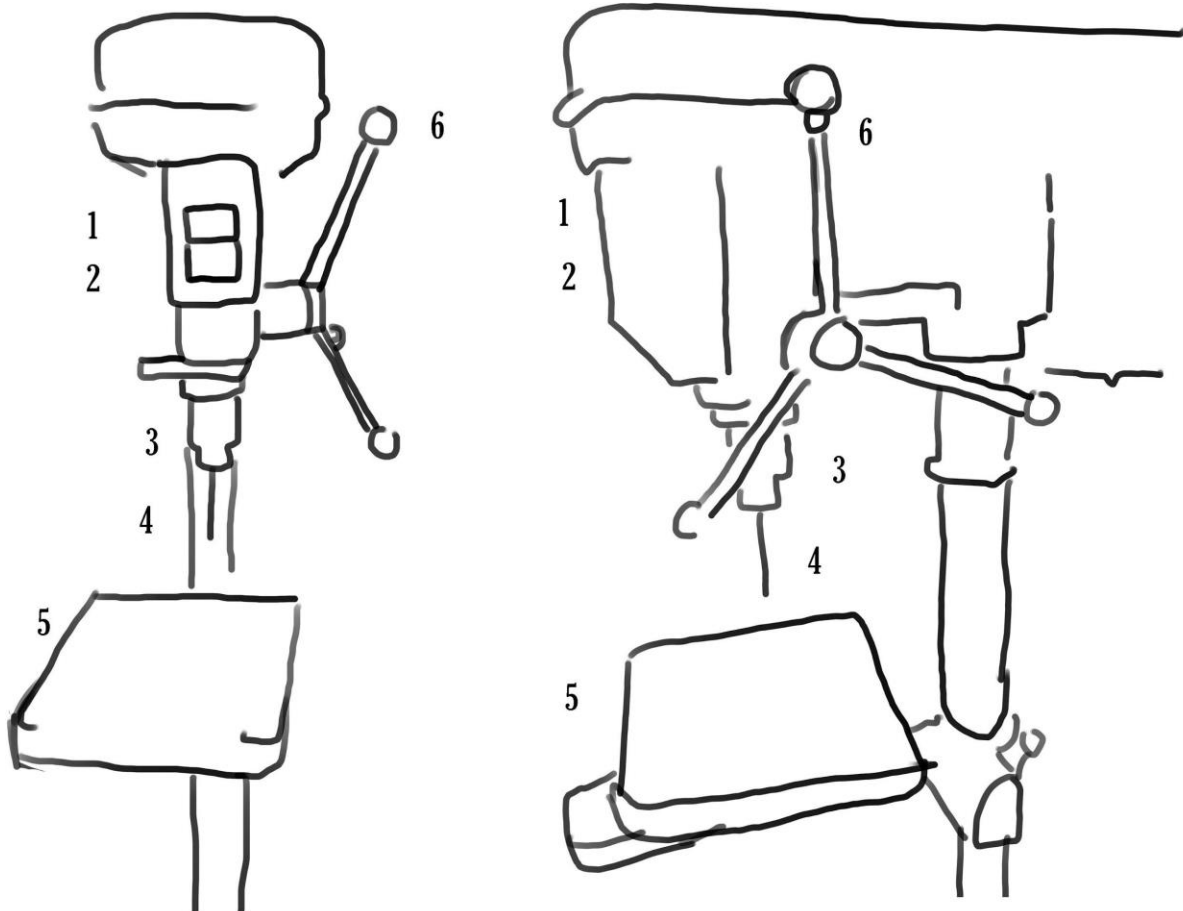
It's important to remember safety while using any machine. Before starting anything make sure to:

- Tie back loose hair
- Wear safety glasses
- Remove loose articles of clothing
- Avoid distractions
- Don't use a machine you are not trained to use
- Wear closed toed shoes
- Clean up any mess you make
- Ask for help if you need it
- Never wear gloves



The Drill Press

The drill press is a machine used to drill holes that is fixed on a set stand.



Parts of a Drill Press

1. On Button
2. Off Button
3. Chuck
4. Drill Bit
5. Table
6. Feed Lever

How to use the Drill Press

1. Find the right size drill bit and insert it into the machine.
2. Tighten the chuck.
3. Mark where you want the hole drilled.
4. Center punch where you want the hole.
5. Place the object you want to drill on the table underneath the drill bit.
6. Use a vise if needed.
7. Line up the drill bit with where you marked the hole.
8. Turn on the drill press.
9. Slowly pull down on the feed lever until you have drilled through the material.
10. Turn off the drill press.

Drill Bits



Twist drill bits are general purpose bits used for drilling holes in wood, plastic, steel, etc. These drill through a wide range of materials.



Spur bits also known as dowel drills are for drilling through wood. They are easy to keep centered and drill faster than other bits through wood.

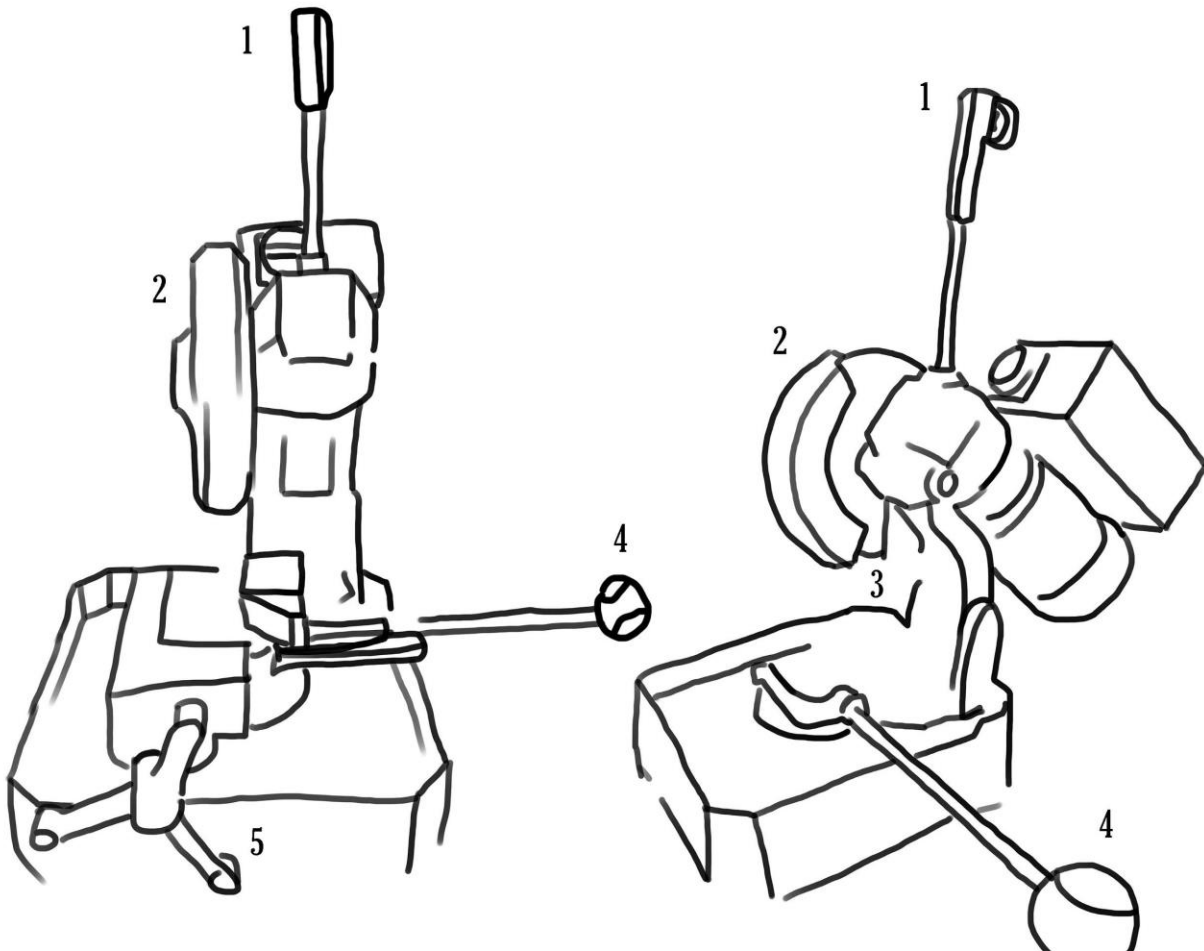


Masonry bits are made of steel and used to drill through stone, brick, block, etc.



The countersink drills a shallow recess for screwheads to fit. These come in many patterns but all have a similar purpose.

Cold/Chop Saw



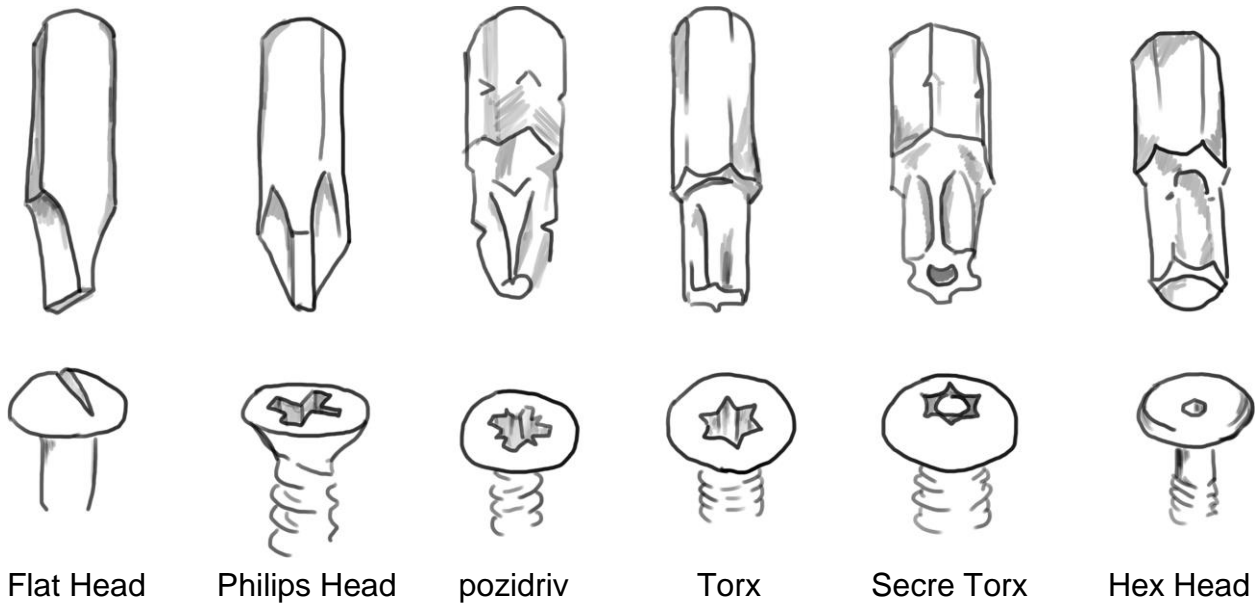
Parts of a saw

1. Handle
2. Guard
3. Blade
4. Work Stop
5. Vise

How to use the cold/chop saw

1. Place the object you want to cut into the vise under the saw.
2. If you will be cutting multiple pieces of the same size you can set up the stop on the right hand side of the machine.
3. Turn on the saw.
4. Pull down the trigger on the handle of the lever to start the saw.
5. Slowly pull down the lever until you have cut completely through the material.
6. Take out the piece and rinse it off.

Screwdriver Types



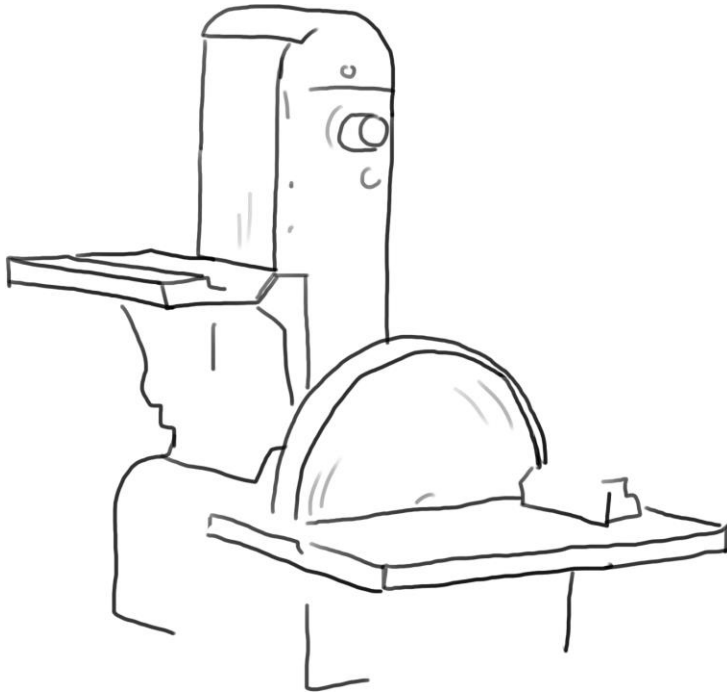
How to Use a Screwdriver

1. Place the screw into the hole.
2. Put the tip on the screwdriver into the screw.
3. Turn the screwdriver right to tighten or left to loosen.*

*Remember: Righty tighty lefty loosey.

Belt/Disc Sander

The sander is used to smooth rough edges after cutting. The sanders are clearly marked whether they are for metal or wood.



The metal sander is for metal ONLY. Do not use it to sand wood or plastic, because this can start a fire.

In our shop we have a combination of belt and disc sander, the belt is on the left hand side, and the disc is on the right. When using these machines make sure you tie back long hair and loose clothing articles.

Tapping

Manual tapping is used to put threads into a hole. This will make it so that you can put a screw into the hole.



A self-tapping screw taps its hole as it is driven through the material. To find out what size tap you need, you can reference a chart.

#8-36	0.1640	4.1656	36	0.706	#29
#10-32	0.1900	4.8260	32	0.794	#21
#10-24	0.1900	4.8260	24	1.058	#25
#12-24	0.2160	5.4864	24	1.058	#17
#12-28	0.2160	5.4864	28	0.907	#15
1/4-20	0.2500	6.3500	20	1.270	#7
1/4-28	0.2500	6.3500	28	0.907	#3
5/16-18	0.3125	7.9375	18	1.411	F
5/16-24	0.3125	7.9375	24	1.058	I
3/8-24	0.3750	9.5250	24	1.058	Q
3/8-16	0.3750	9.5250	16	1.588	5/16 in
7/16-14	0.4375	11.1125	14	1.814	U
7/16-20	0.4375	11.1125	20	1.270	25/64 in
1/2-20	0.5000	12.7000	20	1.270	29/64 in
1/2-13	0.5000	12.7000	13	1.954	27/64 in
9/16-18	0.5625	14.2875	18	1.411	33/64 in