

## The Jeweler's Saw

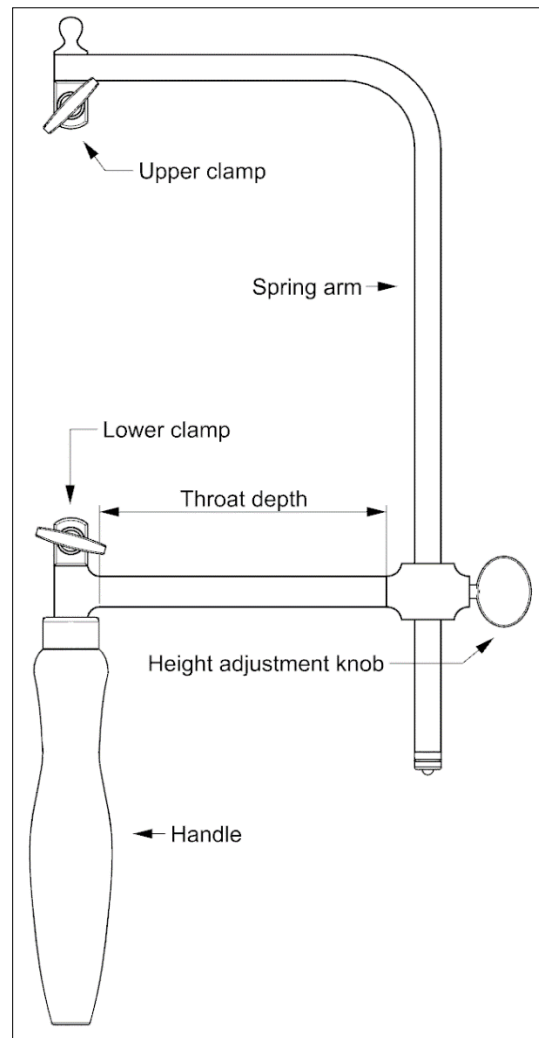
The jeweler's saw is one of the most important tools in any jeweler's arsenal; it is used for everything from utilitarian applications such as cutting raw stock, to more ornamental endeavors such as piercing intricate designs. Learning how to properly use the jeweler's saw is instrumental to your success.

### Part 1: *The Anatomy of a Jeweler's Saw*

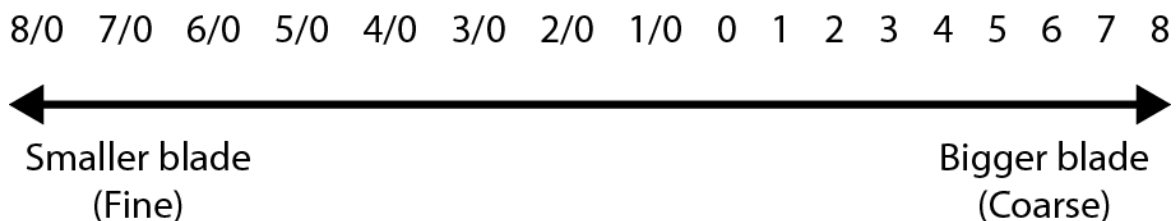
Though there are many different variants out there, the most common type of jeweler's saw is the German pattern saw frame. (Pictured to the right.) This classic design has stood the test of time and proved over and over again that you do not need to reinvent the wheel.

This saw frame can be broken down in several parts:

- **Upper and lower clamps:** These hold the saw blade in place.
- **Spring arm:** The part of the saw that undergoes compression.
- **Throat depth:** This can range from 1 inch long to over 8 inches. A saw with a bigger throat will allow you to cut wider sheets of metal, but it comes at the cost of stability. On the other hand, a saw with a shorter throat will be more stable and precise, but you will be limited in what metal you can cut. 3 inches is a good compromise between these factors.
- **Height adjustment knob:** Use this to adjust the height of the spring arm. Allows you to fine tune the tension and use non-standard sized saw blades.
- **Handle:** You hold this to operate the tool.



Your typical saw blades look like thin, flat wires with small, sharp teeth. The size of each saw blade is categorized by the following scale:



A size 8/0 is the smallest blade with the finest teeth and thinnest kerf<sup>1</sup>, while a size 8 is the largest blade with biggest teeth and widest kerf. It is important to select an appropriate sized blade for the work you are doing; you wouldn't want to cut a thick plate of metal with an 8/0 blade, nor would you want to cut a thin piece of 24g metal with a number 8 blade. Use the following chart to determine what size saw blade would be appropriate for the metal you intend to cut.

Blade size	Blade thickness	Blade depth	Teeth per inch	Recommended for: (B&S gauge)
8/0	.0063"	.0126"	89.0	up to 26
7/0	.0067"	.0130"	84.0	24-26
6/0	.0070"	.0140"	76.0	24
5/0	.0080"	.0157"	71.0	22-24
4/0	.0086"	.0175"	66.0	22
3/0	.0095"	.0190"	61.0	22
2/0	.0103"	.0204"	56.0	20-22
1/0	.0110"	.0220"	53.5	18-22
1	.0120"	.0240"	51.0	18-20
2	.0134"	.0276"	43.0	16-18
3	.0140"	.0290"	40.5	16-18
4	.0150"	.0307"	38.0	16-18
5	.0158"	.0331"	35.5	16
6	.0173"	.0370"	33.0	14
7	.0189"	.0400"	30.5	12
8	.0197"	.0440"	28.0	12

The rule of thumb is that the metal should be three saw teeth thick—but in general you can consider a 2/0 blade as a good “all-rounder” for the metals typically employed in this class. (16g, 18g, and 20g.)

Other types of saw blades exist as well, such as *spiral saw blades* which are coarser and twisted so that they don't clog as easily. (Pictured below.) These are designed to cut softer materials such as wax.



**Pro-tip:** Not all saw blades are created equal. Low-quality saw blades will not cut as accurately or efficiently as higher quality ones. If you buy cheap sawblades you're going to have a bad time.

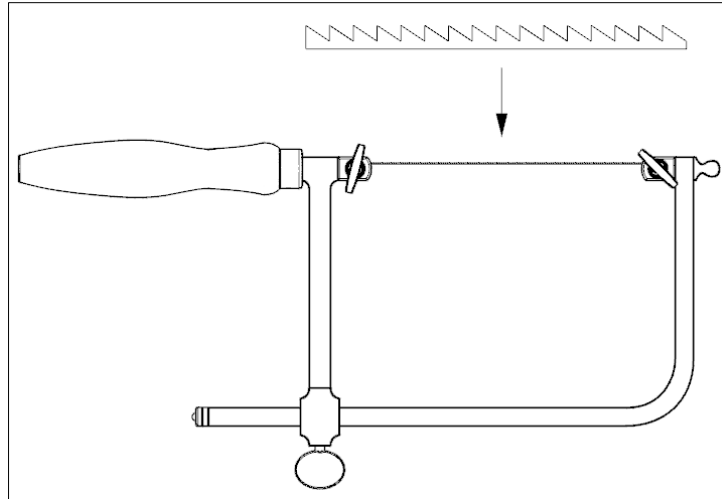
<sup>1</sup> A “kerf” is the gap left behind in the material when cut with a saw.

## Part 2: Loading the Jeweler's Saw

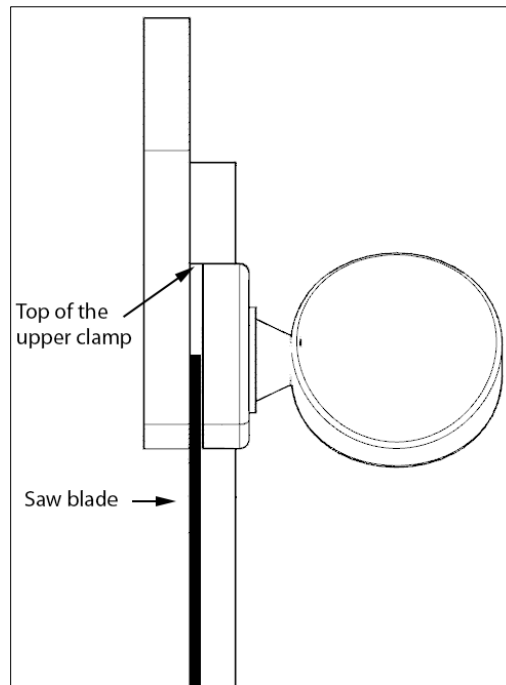
The very first step in using the saw frame is to load it with a saw blade.

1. Brace the saw frame against your bench and insert the bottom of the saw blade into the lower clamp. (The bottom of the saw blade should sit at the bottom of the lower clamp.) Tighten the thumb screw to lock it in.

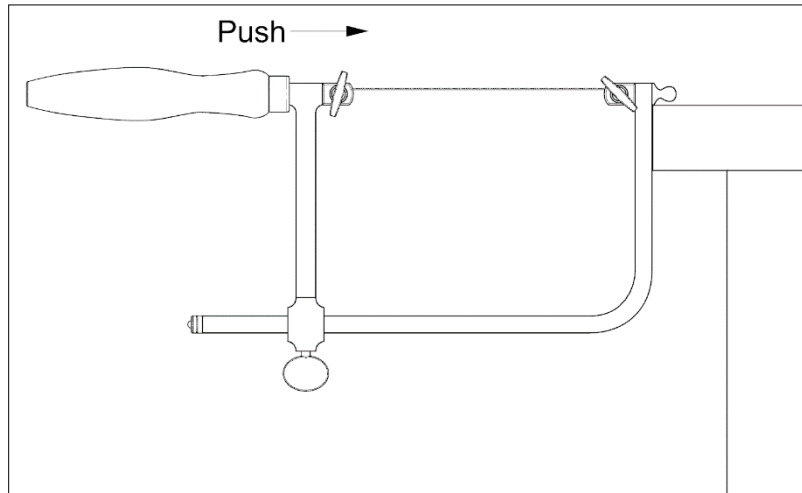
**Make sure that the blade is facing the correct way.** The teeth should be pointed outwards and down towards the handle. (As seen below.)



2. The saw blade should sit roughly in the middle of the upper jaw. (As pictured below.) If it isn't, release the tension knob, and adjust the spring arm by moving it up or down. Tighten the spring arm when this is achieved.



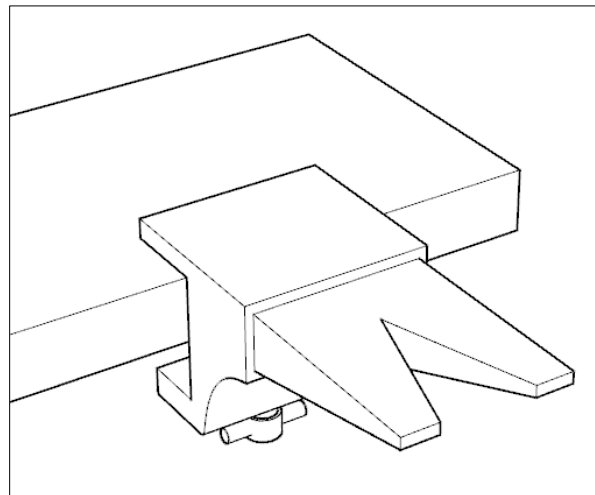
3. Compress the saw frame by pushing it against your bench, you should see the saw blade touch the top of the upper clamp. Tighten the knob on the upper clamp while the saw is still under tension to lock the blade in place.



4. If done correctly, the saw blade will make a high “ping” sound when plucked. If it makes a dull sound instead, your blade is too loose. If this is the case, you may need more space between the top of the saw blade and the upper clamp. Adjust the spring arm accordingly and repeat the process. **It is critical that the saw blade is under an appropriate amount of tension to ensure that it cuts properly.**

### **Part 3: Using the Jeweler’s Saw**

It is very important to hold your work securely when you cut it with the saw frame, otherwise the blade will snap. The most effective way to support your work while cutting is to place it on a *Bench Pin*: a piece of wood with a “V” groove cut into it. (Seen below.)



Place your metal on top of the V groove such that the metal is making contact with both sides of the V.

Hold the saw frame in a somewhat loose grip; the tool will do most of the work and holding it like this will prevent you from being too aggressive.

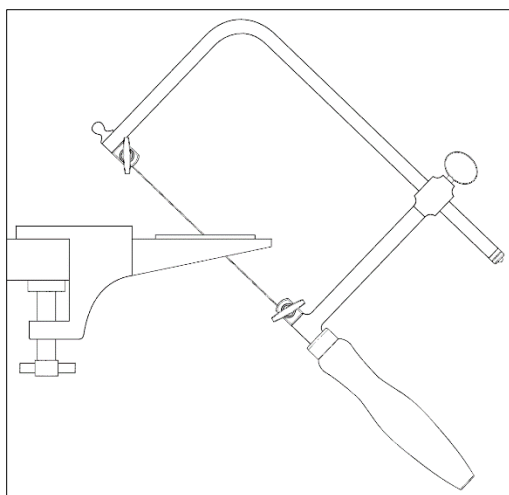
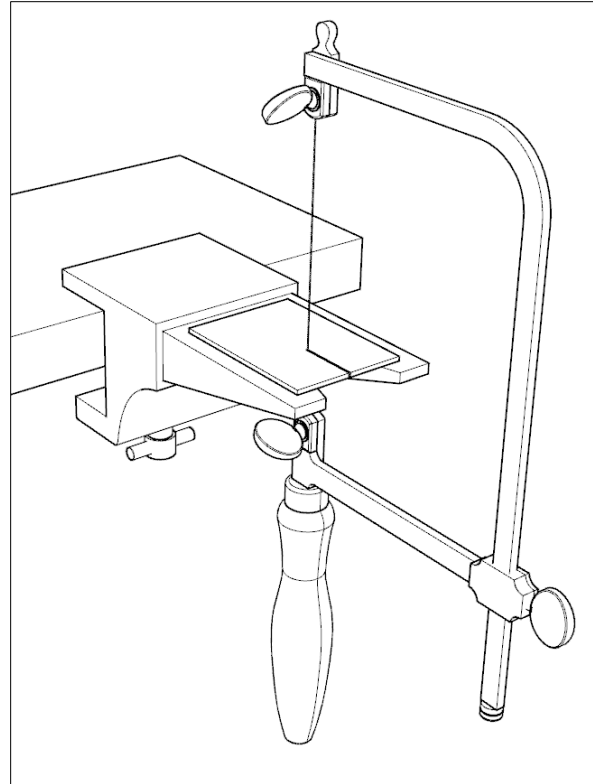
Position your saw so that it is perpendicular to the metal (pictured to the right) and gently move the blade up and down, making sure to travel the entire length of the blade as you cut.<sup>2</sup>

Sawing metal should be a relaxing, rhythmic process where the saw is moved up and down against the work. The saw cuts on the downward stroke, so you should feel a slight pressure being applied to when you pull it down, then pulling up on the return stroke should feel imperceptibly light.

Sawing forward is fairly intuitive: gently push the saw forward while moving it up and down. To cut curves, gradually turn the saw frame while maintaining this up and down cutting rhythm.

To cut corners and acute angles, maintain this up and down motion without moving the saw forward. While the blade is going up and down in place, slowly turn the saw frame to the desired angle, and then proceed with the cut.

**It is very important that you always keep the saw moving up and down while cutting curves, angles, and corners. If you turn the blade without this motion, it will snap.**



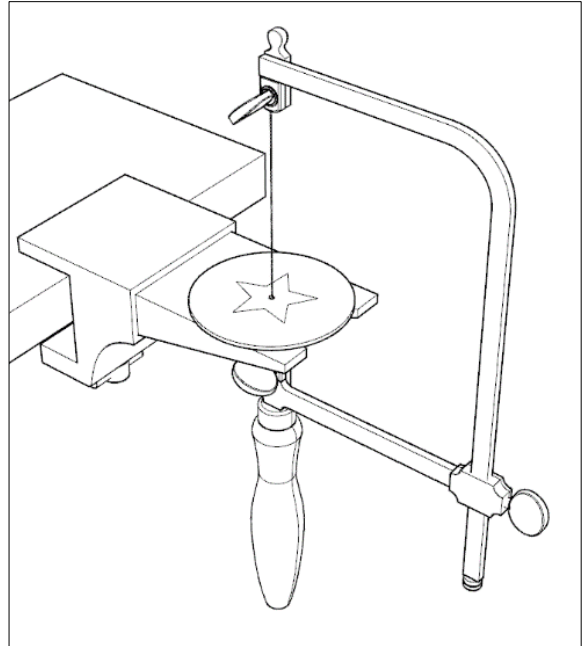
Holding the saw frame at a 90-degree angle to your work offers you the most amount of control when making complex curves and angles. However, if you want to cut a perfectly straight line then it helps to angle your saw frame forwards while cutting. (Pictured to the left.) This will increase how many teeth make contact with the metal at any given time, thus guiding the cut forward.

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<sup>2</sup> This evenly distributes the wear on the blade, which will make it last longer.

If you want to cut a design out of the middle of a shape, you will need to employ a technique referred to as “piercing.” This is when you drill a small hole just big enough for your saw blade to fit into, thread your saw blade through this hole, and then tighten the saw blade in its frame. This will allow you access to the inside shape you wish to cut out. (Pictured to the right.)

**Pro-tip:** Drill your hole somewhere in the middle of this design. If you drill directly on one of the lines you will end up a line that has a semi-circle cut into it after all is said and done.



#### **Part 4: Layout Practices**

The easiest way to ensure an accurate cut is to mark the metal in some way and then follow that mark with your saw. Obviously, the easiest way to do this is through drawing implements such as markers, pencils, and so on—however, the problem with these is that the lines they produce are too thick. This can result in a meandering, inaccurate cut.

One solution is to use a finer point marker, such as the ultra-fine tipped ones sold at many art supply stores. However, these too are flawed due to the fact that they tend to dry up rather quickly when used on metal, and their marks can rub off when the metal is handled during sawing.

A better solution would be to paint the piece in layout dye such as *Dykhem Blue* (A fast drying paint of sorts) and then scratch lines into the metal with a scribe. This will allow you pinpoint accuracy, provided your marks themselves are accurate.

Another solution is to utilize a computer assisted design program such as *Rhino* or a graphics program such as *Photoshop* or *Illustrator* to create a design with thin, precise lines and then print that out. (You could also find an image or a vector on the internet and use that.) You would then simply affix the printed design to the metal by brushing a thin layer of rubber cement on to the metal and placing the paper design on top of it. The rubber cement will hold the pattern securely as you cut out the design, and when it comes time to remove it you can peel it off easily and with no mess.

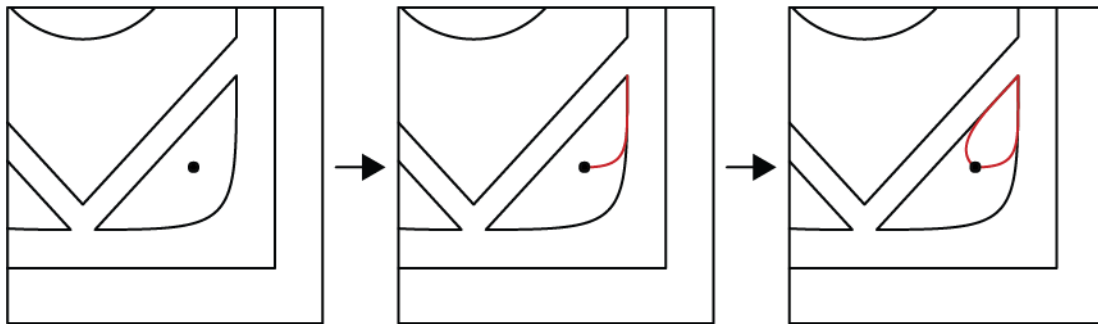
If you are good at drawing, you could employ the above method as well—except you would draw out your design on paper with a thin tipped drawing implement and then use rubber cement to affix that to the metal.

## Part 5: Tips and Tricks

**Pro-tip:** Whenever you use the jeweler's saw to cut a design out of a sheet of metal, you must be mindful of the kerf of the sawblade; this is the gap the blade leaves behind on the metal. You should avoid cutting directly on a line when cutting out a design, as certain sections can end up thinner than desired due to the aforementioned kerf. Instead, it is better to cut the design out by cutting just shy of your lines and then using files to remove material right up to that line.

**Pro-tip:** When cutting acute angles, sometimes it is not the best idea to utilize the technique discussed earlier in this paper where you rotate the blade in place and then orient it in the correct direction. This method can leave behind a tiny pin-hole right at the tip of the angle, which can be very difficult or impossible to remove depending on how acute the angle is.

Instead, you can avoid this problem by cutting a path (shown in red in the diagram below) towards the tip of the angle on both sides, thus ensuring that the corner of the angle is crisp as can be.



**Pro-tip:** You can use the blade of the jeweler's saw to "file" parts of your piercing to a certain extent. Simply rub the blade against the problem area in a parallel manner, and you will gradually remove material. Sometimes this is the only way to refine really tiny, hard to reach areas.