I do not consider myself a professional engraver, but have learned on my own how to do simple jobs. I make all of my own bolt handles and checker the knobs. I inlay the panels with gold and silver to make them more pleasant to view on a custom job.

The trick to learning how to cut good lines was when I made up a good tool to sharpen the gravers. This tool is an evolution of James Meek’s tool in his book on Engraving. I changed up parts to make it understandable for a beginner to see when you are making the correct angles on a graver. The basic graver is made from a 1/8 inch 5% cobalt lathe bit. These are cheap to buy from a tool supply place or from most engraving suppliers. I have made some very good gravers from the high speed hack saw blades that are about 1/16 inch thick. I used a diamond cutting saw in my high speed hand grinder to cut these into 5/16 inch wide by 2 ½ inch lengths. You can make very good gravers from M-42 cobalt drills. These can be bought from surplus dealers at guns shows. Sometimes they will have these drills from the aircraft industry surplus sales which can be 1 foot long and very cheap to purchase. Try to buy the drills up to 1/8 inch in
diameter if possible. Don’t over heat the graver when grinding the tool to shape. On all round gravers you will need to grind a flat on the rear area to index the tool when you place it into a sharpening tool. I use the Eze-Lap diamond steel 2 X 4 inches in a fine as the basic lap plate after the grinding of excess material has been remove on a bench grinder. A fine ruby stone is good for making the final polish of the angles which can be bought from Brownell’s. I also use carbide drills after they are broken to make gravers for cutting very hard steel.

I have designed this tool for myself to use in sharpening gravers without the use of a power hone. Beginning engravers should have this type of tool to start learning the correct angles used by most engravers. I wanted to have a tool that would show the correct angles marked on the controlling parts holding the graver. This is what happened to come out after several years of changes. In 1988 I decided to learn some of the basic engraving needed to do simple jobs. My general gunsmithing took most of my time so engraving was placed on the back burners.

The basic graver to start with is the diamond point which is easily made from the 1/8 inch square lathe bit. It will be a 90 degree cutter with a 45 degree face angle and will have about a 15 degree heel to make it controllable when cutting. The heel is on the bottom of the graver and is just about .020 inch long. On hard steel most engravers are using the carbide gravers and some will use the 120 wide graver which will have less breakage of the tip. You will spend more time in sharpening gravers than engraving. The internet has several good sites to check on engraving and tool sharpening.

These are some of the tools that I use to make the custom bolt knobs. I make the knobs on my lathe, but you can buy knobs from Brownell’s ready to engrave. I made a milling cutter the shape of a knob and used it to make the aluminum blocks. These work very well in the engraving vise and also use the bottom blocks to place on the knob when welding it on a bolt to keep heat away from the panels. These templates are formed in the blocks out of soft brass sheet material. True up the radius and the point to match. Scribe a light line on the knob to engrave and place the center hole and the point on the line. Scribe lightly around. The round caps
are for marking the indexed panels around the knob from the center of knob.

STUDY EACH PART OF THE TOOL AS DESIGNED. ALL PARTS ARE MADE WITH ROUND PARTS, FLAT STEEL AND SQUARE STEEL. YOU WILL USE THESE FLATS TO LINE UP THE TOOL LATER.

I will give the dimensions of the tool parts and if you have a lathe you should make one for yourself. Some of the dimensions will probably be left out, but you should be able to look at the pictures and make the tool.
The bearings are about .746 in diameter and the hole is about .234 in. diameter. The number is (American made with N.D. 36) on the side. The metal base is .625 inch X 3 inches plus the end is turned to fit inside the bearing hole. A .010 surface for the base of the bearing to fit up against is shown. An 8 X 32 tpi hole is about .500 in. deep to hold the bearings on the base.

The upright shaft is .375 dia. X 3.725 long. The shaft is milled flat on the back side for the stop screw to hold the extension arm square with the base. A 8 X 32 tpi set screw is used hold in place until final assembly and then it is SUPER GLUED in place when all parts are lined up.

The extension arm is 2 pieces. The short section is .500 square X 1.200 long. The other end is .312 in square X 3.000 inches long with one end turn down to .250 dia for .375 long. This is inserted into the short section and is hold in place by a 8 X32 tpi set screw. Later on you will need to adjust the .312 square with the front angle cross section then super glue the parts.

The angle heel and face piece is .750 dia. X 1.625 long. Bore the surface for the angle holder of the gravers 1.010 dia. X .187 deep. Drill center .500 dia. Drill and tap for .250 X 20 tpi in both
ends. Use all thread .250 dia. X 20 tpi and super glue this in place. Notice that there is a .312 slot milled into the end cap in the above picture to match up on the extension arm. This holds the cap end from rotating when adjusting the angle for the heel or face. The cap is cut to recess into the larger piece.

The angle dial is 1.000 dia. X .250 thick. The graver holders are made from .500 dia. X .950 length round bar and drilled out to .375 dia. The inside parts are machined from .375 dia. round bar. The square holder in cut with a .375 inch end mill to just over 1/2 of its dia. The flat holder is milled with a slotting saw. After these parts are finished I used super glue to hold them
inside the .500 dia. parts. Thumb screws are 8 X 32 tpi and the ring for holding the graver in place is .750 dia. X .250 thick.

There is a set screw in the angle dial to hold the parts together. I placed the screw at the zero location and you can see in the next picture.

The angles on the heel or face are shown in the picture. The large dial for the angles from zero (0) to create the heel lift can be set to any angle, but usually about 15 degrees. 0 to 45 left and 0 to 45 right will make the 90 degree diamond used by many engravers. 0 to 30 left and 0 to 30 right will create the 120 degree for a wider cut. Etc. The face is cut with the (F) turned to the bottom marked place and the 0 to 90 side set to about 45 degrees.
TOOL TO MARK THE ANGLES ON THE 0 TO 90 SCALE

This is the slow part in making the tool. I made this jig to hold the .750 dia. part inside and mark from the notch. Nothing like a micro indicator as this!!!
This is the flat graver and it shows how the thumb screws hold it in place. I change out the inside parts to hold flats and only one set screw to hold all parts into the knurled angle ring. A four jaw chuck is used to hold and bore the area for the knurled ring.

If you want a radius on the bottom of the heel just run it up the ramp.

FOR MORE INFORMATION ON SHARPENING GRAVERS GO TO

WWW.IGRAVER.COM

Sam Alfanso is a top engraver and has lots of info.

Look for books on engraving in Brownell’s catalog. There are several supply houses that carry most anything for engravers. Ron Smith has a couple of books on designs and scrolls
which you will find very informative. He is a world class engraver and has engraved a couple of guns that I stocked and blued. We go back to the 1970’s when both of us were a lot younger.

The next few pictures are of tools I made before I bought the GRS engraving ball vise. My tools worked for me and you can see how to get started without too much expense.

Crossed hatched block to hold in place on the steel plate with the diamond steel lap.
Brownell’s sells the checkering files and I use these to space the lines only. You need to complete the lines to the edge with the 90 degree graver. The angle is set for a 2 X 1 diamond or a little more like 2 ½ X 1.

This counter balanced weight is to keep a barrel from being too heavy on the end while rotating in the jig. This works well and it keep down vibrations with the support under the barrel. You can switch ends and engrave the muzzle if you use a muzzle cap to support the end of the barrel without anything being placed inside on the lands.
A drill press vise is used with the rotating head to make a cheap engraving tool. The next picture shows the parts to make this rotating head.

The shaft is ¾ inch X about 4 inches. Drill a hold through the 3 X 4 inch channel iron with a 1/2 inch drill bit. Turn shaft end to ½ inch and just long enough to come near the top of the channel iron. Weld the shaft on the top side. Place a washer between shaft and the channel iron to support the bearing race. The 2 X 2 X 3 ½ inch square tubing is about the right size to force the race into without having to machine the tubing. The aluminum blocks are the friction adjustments and a ¼ X 20 set screw on both sides will let you set the tension as needed. A collar on the bottom with a set screw will keep the parts tight together.
Don’t notice the screw which is not lined up as this is when you get in a hurry to shoot a picture before things are in place.

Butt end on a Martini 15 action from pieces that I made for this job with the stock bolt under the large center screw in the tear drop.
Mini Mauser 17 Rem bolt handle

Another screw not lined up!!!!
These are a few of the gravers that I have in my collection. With these few gravers you can do most of the engraving that I have shown in the article. My hammer is one that I made and it is about 1 inch in diameter. I also use a Ngraver shaft driven hand piece to speed up the work. It has helped very much in learning to control a graver. You will need some type of eye magnification to see the small cut lines. It will depend on how much you can see without the helpers. I am now down to 10X to see the work. Raise the handle up enough to start the graver into the steel and then lower to control how deep it goes. The cut will go forward when all is correctly held and the hammer will make little hits on the back of the handle.
This is the basic information for you to use in getting started engraving. There are several summer classes for the beginner at the NRA short courses in the gunsmithing schools. I would suggest that if you think you have the artistic touch for engraving go for it now. Most of us waited too long to get started because of making a living in general gunsmithing. If you can make stocks than you can learn to engrave.

The tools in this CD shows how I made most of my own tools. I am one that believes that a person can make almost anything if you have a lathe. GET STARTED NOW!!!!!

Hope this helps,

Les Brooks, Gunsmith