Thousands of military bolt action rifles have been imported in recent years. While many of these are beautiful specimens that are better left to collectors, most are in sound mechanical condition but rate only fair aesthetically. These rifles are excellent candidates for sporterizing. Before they are suitable for building into a high-grade rifle, however, the receiver should be machined or ground to eliminate cosmetic defects.

This tool is used in conjunction with our receiver mandrel. It allows the gunsmith to precisely remove clip slot humps, rear sight ears, and damaged areas from the rifle’s receiver. Because the mandrel is centered in the bolt runway, the metal removal is concentric with the bolt. With careful work, the end result is a completely resurfaced receiver.

Before discussing the technique used with this jig there are some safety concerns that must be addressed:

1) Wear eye protection and, when grinding, a filter mask to prevent inhalation of metal and grinding wheel particles.

2) Allow the machine spindle to stop completely before adjusting the receiver’s position in the fixture.

3) The receiver mandrel must be screwed tightly into the receiver’s barrel threads. You are depending on this threaded joint to hold your receiver in place. If it comes loose your receiver could be damaged beyond repair.

4) Take light cuts to avoid excess vibration. Excess vibration could cause the mandrel to loosen.

5) Feed the receiver against the rotation of the wheel when grinding. This is especially important when using the drill press to prevent the receiver from being snatched out of your hands.

6) Be conservative when grinding the front ring. DO NOT remove any more metal than is absolutely necessary. DO NOT attempt to grind a large ring receiver down to small ring dimensions. If the pitting or other damage is too deep, scrap the receiver.

7) Carefully inspect the receiver for cracks, bends or other damage that would render it unserviceable.

WARNING

Never attempt to disassemble or reassemble a firearm unless you are absolutely certain that it is empty and unloaded. Visually inspect the chamber, the magazine and firing mechanism to be absolutely certain that no ammunition remains in the firearm. Disassembly and reassembly should follow the manufacturer’s instructions. If such instructions are not immediately available, contact the manufacturer to see if they are available. If they are not available at all, then you should consult other reference sources such as reference books or persons with sufficient knowledge. If such alternative sources are not available and you have a need to disassemble or reassemble the firearm, you should proceed basing your procedures on common sense and experience with similarly constructed firearms.

With regard to the use of these tools, the advice of Brownells Incorporated is general. If there is any question as to a specific application it would be best to seek out specific advice from other sources and not solely rely on the general advice and warnings given.

WARNING

--BATF has specific regulations regarding the alteration of serial numbers. If you see that your work will alter or remove the serial number from your receiver, contact your ATF agent before you begin the work. Explain what you intend to do, why it is important, and follow his or her instructions to the letter.

SETTING UP

--You must have an appropriate Receiver Facing Mandrel to mount the receiver in the fixture. You may purchase the mandrel from Brownells or you may make your own. In either event, the “front” end must measure .750” and the “back” end, .700”. Your mandrel may have to be shimmed up or polished down to meet this requirement. This is essential for the receiver to set level and straight in the fixture. We have mandrels available for Large Ring Mauser, Small Ring Mauser, P-14 and P-17 Enfield, 1903 Springfield, Remington 700 and Winchester Model 70. You may use the Receiver Contouring Fixture with the drill press, milling machine, or surface grinder. The techniques differ to some degree but the principle is the same. The receiver is passed beneath the cutter or grinder, a small amount of metal is removed, the receiver is rotated a degree or two, and the process is repeated until the entire surface has been covered.

---For the sake of illustration we have taken a Mauser 98 through the required steps to show you what you can accomplish.

--This 98 receiver has had the crest crudely removed from the front ring but no other re-contouring has been attempted. We will contour and clean up both the front ring and bridge.

USING THE MILLING MACHINE OR SURFACE GRINDER

--Our work must remain parallel and concentric with the centerline of the bolt. The first step is to square the fixture with the table of the machine. Loosely mount the fixture to the machine’s table using toe clamps. Mount a dial indicator on the machine...
spindle. Adjust the position of the fixture until the indicator’s needle shows that the fixture is square (no movement of the needle) with the table. Run the indicator along the edge of the fixture as pictured.

--Once the fixture is square, tighten the toe clamps to secure it. You are now ready to mount the receiver in the fixture.

--Clean the receiver’s threads and screw an appropriate Receiver Facing Mandrel tightly into the receiver. Because the ends are different sizes, the receiver and mandrel will only go into the fixture one way. To avoid vibration, slide the receiver ring up close to the fixture’s vertical upright. Tighten the clamp screws onto the mandrel (pad the screw tips with pennies to prevent burring of the mandrel). Center the receiver under the 5/8” carbide end mill or surface grinder wheel and begin work. By taking light cuts and rotating the receiver slightly between cuts you will be able to remove metal concentric with the bolt centerline. It may take more than one pass over the receiver ring to accomplish your goal. When you finish, you will have a series of very small flats that are easily blended together using sanding cloth backed by a piece of flat metal or wood. The following pictures show the initial cut and the work in progress.

--Milling or grinding the receiver’s bridge is easier and more accurate in this fixture than by hand. For Mausers, the most common request will be to machine the receiver’s bridge to match the commercial FN and Mark X receivers. You will need a common 30-60-90 degree triangle for the setup. Place the 30 degree angle against the bottom of the receiver and the base of the fixture as shown in the picture.

--Mill or grind the receiver bridge until the hump directly behind clip slot is leveled to the surface of the original flat. You should remove any damage to the original flat in this process. Rotate the receiver and, using the triangle again, setup to cut the other side.

--The rear bridge of an Enfield receiver can also be modified using this fixture. You have several options with this receiver. Remington used the Enfield action on their Model 30 rifles and
simply cut the rear bridge down to the same level as the front ring. Other options include multi-faceted flats, such as octagon, or following the above instructions for an FN Mauser shape. The Enfield receiver shown on page 2, is being shaped into a square bridge with an integral scope base. You are limited only by your imagination.

GRINDING ON THE DRILL PRESS

--A common drill press and our Cupped Grinding Wheel (#467-774-187) and Arbor (#368-448-000) can be used with this fixture to obtain the same results that you get with larger, more expensive tools. In many cases, grinding in the drill press leaves a better finish and requires less hand finish work to do later. The primary difference is that you will be pushing the fixture under the wheel by hand rather than on a moving table. Light cuts and a firm grip are a must. We recommend practicing on a scrap receiver.

--Begin your setup by attaching a strip of straight metal to the drill press table. This will be your fence to guide the fixture. The top dead center of the receiver in the fixture should be under the edge of the wheel. Using the same cut-and-turn method outlined above, grind the receiver until you get the desired result. You must bear a few things in mind while doing this work.

1) First and foremost is to **keep your hands positioned low on the fixture.** Never, never allow your hand to stick up above the top of the fixture.

2) Feed the receiver against the rotation of the wheel as shown in the picture. This will prevent the wheel from grabbing the receiver and pulling it out of your grip.

3) Always remember to take light cuts.

--The setup for modifying the receiver bridge is the same as for the mill or surface grinder. You do not have to use the fence when grinding the clip slot hump off. Carefully feed the receiver into the wheel a little at a time. Pay strict attention to the “feel” of how things are progressing. Remember to take light cuts and don’t rush your progress.

FINAL FINISH

--Use sanding cloth with a hard backing board to carefully blend the many little flats you have created into a smooth radius. Take care not to destroy your new contours with sloppy hand work.

Blending the contour with sandpaper on a hard backing board.

--It’s a real joy to look at your finished receiver and to see the smooth, even contours you have given it. The final hand work has been started on this one. The front ring has been blended and the rear flats have been polished using sanding cloth backed with a block. Compare this receiver with it’s first photograph. It will make a beautiful rifle.