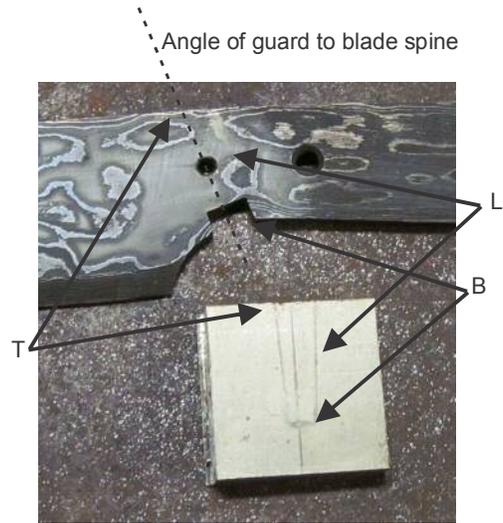


U-Guard (Riveted & Soldered) – Full Tang Blades

S.A.Bloom, IronFlower Forge

Blade Design:

- A. Set angle of guard to blade spine & mill 1/4" recess (appx 1/8..1/4" deep) – assuming 1/4" thick guard material
- B. Scribe midline of guard, mark & drill rivet hole. It must be > 3/32", i.e., #39
- C. Layout usual pin holes and drill with a #30 bit
- D. Grind, heat treat, final grind, and etch



Layout:

- A. Measure thickness at the spine (T), at the base (B) and the running length (L) – this is usually the forward face of the guard.
Example: T=190, B= 140, L=700 (in units of 0.001")
- B. Angle of wedge (from centerline) is $\arctan \left(\frac{T-B}{2L} \right)$. Example = 2.04° .
- C. Transfer results to the guard block (typically 1" tall x 3/4..1" wide)

Milling Slot:

- A. Clamp block to milling jig – center scribe line on block ought to parallel the longitudinal scribe line on the jig.
- B. Place jig in mill vise – block to the right. Use the 1/2" R8 collet and the slitting saw arbor. Extend the arbor as much as possible to maximize distance between the saw blade and the spindle nose.
- C. Using the digital protractor and with the removable rear pivot in place, set the calibration (zero) on the protractor.
- D. Remove rear pivot, slack the vise and allow jig to pivot down into the vise using the screw adjustment (rear and left) to fine tune the resulting angle. Lock the vise.
- E. Run the saw blade to the front and eyeball the lower surface of the saw blade to the lower scribe line on the block. Run the blade to the right of the block and back until the guard is at right angle to the blade. Turn on the mill and



gently approach until contact is made. Zero the left-right feed and advance the table L units to the right. This produces the right side of the slot.

- F. Back the saw out of the guard. Slack the vise and adjust the angle by elevating the left end of the jig. Lock the vise. Readjust the table height to place the blade at the top of the slot less approximately $\frac{1}{2}$ blade width.
- G. Make the cut as described above.



- H. Raise the table until the bottom of the blade touches the guard. Blade thickness is 80. The amount the table must be dropped is B-80. Run the blade clear, then drop the table the correct amount. Make another cut to complete the slot. Confirm gap with the spine of the blade.

Adjusting the Guard:

- A. If needed, thin the guard until it slips into the slot. A tight fit is desirable. If the gap of guard-to-blade is excessive, anneal the guard, insert into position and hammer the edge to close any gaps.
- B. Polish the front surface of the guard. Typically run down to a #5 belt, then use white rouge. The jewelry vise should be used.



Drilling the Rivet Hole:

- A. Place the blade on the mill using a 6" parallel. Use a copper shim to protect the edge, level the blade along the centerline (compensate for any tapers in the blade and tang). Using blocks and a jack, support the end of the tang. Use the precision drill chuck and the #39 bit to position the table directly over the rivet hole in the blade with the bit freely entering the blade. Lock the table.
- B. Switch the bit for a 3/32" bit. Drop the spindle until the bit just above the blade surface. Drop the table sufficient to allow the guard to slide into position. When dropping the table, keep track of the distance dropped (ex: 500)
- C. Slide the guard into position and if needed, gently tap it home. Start the mill and raise the table by the amount noted in the previous step. DO NOT exceed the amount and if you hear the bit touching steel – STOP!
- D. Remove the guard and using either the mill or a drill press, complete running the 3/32" bit completely through the guard. Trying to run the bit through with the blade in place may result in a broken bit embedded in the guard – so it isn't worth it.



Attaching the Guard.

- A. Run an annealed piece of 3/32" nickel silver rod through the guard when it is in place. If there is a problem, fix it now. Cut the rod to ~1/8" more than the guard width.
- B. Using 2000 grit sand paper, clean the guard interface on the knife and use acetone to clean all mating surfaces.
- C. Place the guard in position, insert the rod and rivet it – taking care to equalize the head on either side of the guard.
- D. Solder the guard using TIX in the standard procedure. Remove excess TIX on the blade and tang sides.



Fabricating and attaching scales:

- A. Select wood to be used. Transfer angle of guard-to-spine to the wood. Saw and smooth the cut using disk sander. Adjust angle as needed. Butt against the guard and trace the outline of the tang. Saw it out.
- B. While pressing the scale to the guard, mark at least two of the pin holes (usually first and last). Use a transfer punch, then drill or clamp the scale with a "C"-clamp and drill the pin holes (1/8"). Take care to position the center line of the blade perpendicular to the drill plane to compensate for any taper in the tang.
- C. Use temporary pins in the holes and epoxy the scale in place. Clamp until glue sets.
- D. Drill any remaining holes and clear the first set of holes. Remember to keep things perpendicular.
- E. Repeat procedure for other side.

Finishing the knife:

- A. Shape handle as desired taking care not to scoop out wood behind the guard.