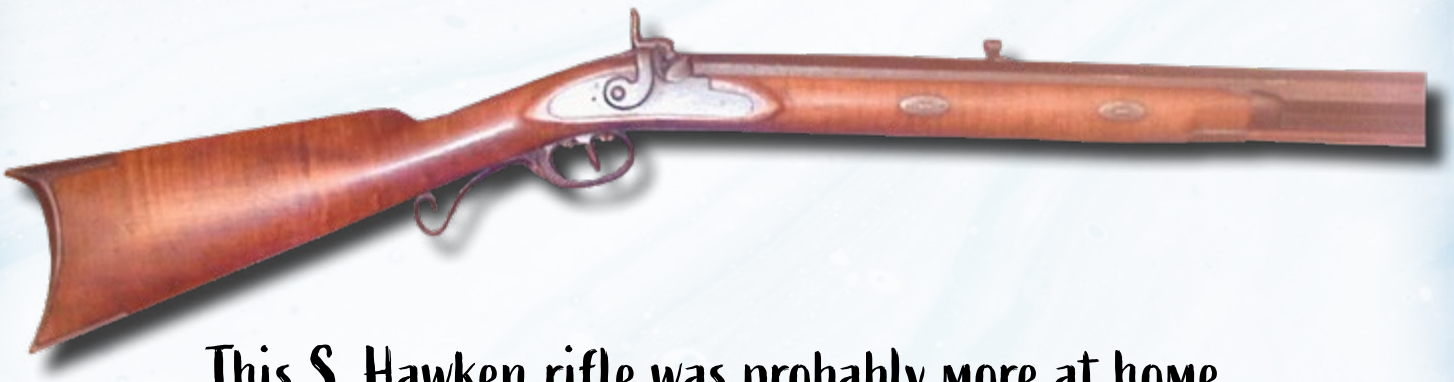
Hawken Halfstock

How-to Part II

By Fred Stutzenberger



This S. Hawken rifle was probably more at home on a migrant's wagon than across a Mountain Man's saddle.
(Photo courtesy of Don Stith, St. Louis Plains Rifle Company)

Part I of this series provided a step-by-step protocol for the cleanup and final fitting of the hooked breech assembly, followed by inletting of the Hawken percussion lock for proper alignment with the nipple. The other major differences between the Hawken Mountain Rifle and the traditional Pennsylvania/Kentucky rifle construction are the trigger & guard assembly and the assembly and installation of the under-rib. They are problematic to the novice Hawken builder and therefore will be addressed here.

Before inletting the trigger plate, excess wood should be removed from the belly-to-wrist area to ease the chore of inletting. Measuring from the bottom of the barrel channel, add ¼" of wood for the web between the barrel and ramrod. Then allow 7/16" for the ramrod hole. To that, add ¼" down to the belly of the forestock. That's a total of 0.95", measuring from the bottom of the barrel. That's perhaps a bit generous, but remember that wood is easier to take off than it is to put back on. Then measure the thickness of the stock from the center of the barrel channel by dividing the barrel channel by two plus the thickness of the side rails. Draw a line *centered* under the barrel channel from the belly to the wrist and mark the ends of the plate inlet just a bit short with transverse lines. The double set trigger blades should be centered on the sear arm line shown in Part I. Don Stith (St. Louis Plains Rifle Company), who knows a lot about building Hawkens, uses the set adjustment screw on the plate as a marker to align with the sear line.

For longrifle builders who have gotten used to broad guard returns covering trigger plate inletting *faux pas*, a pitfall looms: the Hawken trigger plate remains exposed over its whole 10" length. A minor deviation when inletting the forward end will magnify to an obvious structural flaw once out along the narrow flat under the wrist. Not so easy to make an adjustment there as it was on the traditional longrifle with those soft brass trigger guards that can be gently tweaked into alignment. If you plan to put a bit of cast-off in your stock (a nominal ¼-3/8"), now is the time to do the calculations to ascertain just where the toe of the buttplate is going to lie. Considering that you know where the triggers lie, and consequently the base for determining length of pull, it might not be a bad idea to inlet the buttplate (no pitfalls there for the traditional longrifle builder) before inletting the triggers. Personally, being gangly with a neck like an emu, I fit a trigger pull of 14'-14.5"; that keeps my thumb from picking my nose during recoil.

For inletting the trigger plate, I now find it easier to take the barrel out of the stock and clamp the stock to a cast iron angle plate. The angle plate can be pivoted on its T-bolt **(Fig.1)** to adjust the milling table travel so that it exactly follows the centerline of the trigger mortise scribed full length on the belly of the stock **(Fig. 2)**. The extent of the plate, the pivot boss of the triggers and the length of the mainspring are all lined out on the stock before I start milling. The milling process generates piles of chips that obscure the travel of the router bit, so it is handy to have an assistant vacuum up the chips as you mill.

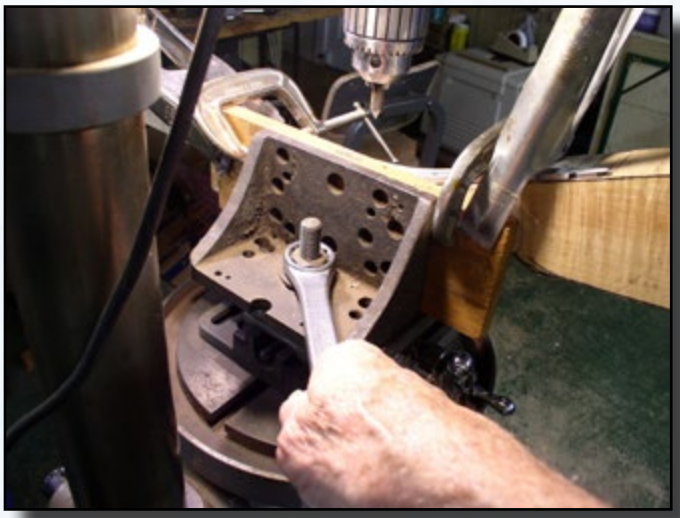


Fig. 1. The position of the plate can be adjusted by loosening the T-bolt lockdown so that the milling table travel follows the stock centerline precisely over the whole length of the trigger mortise.

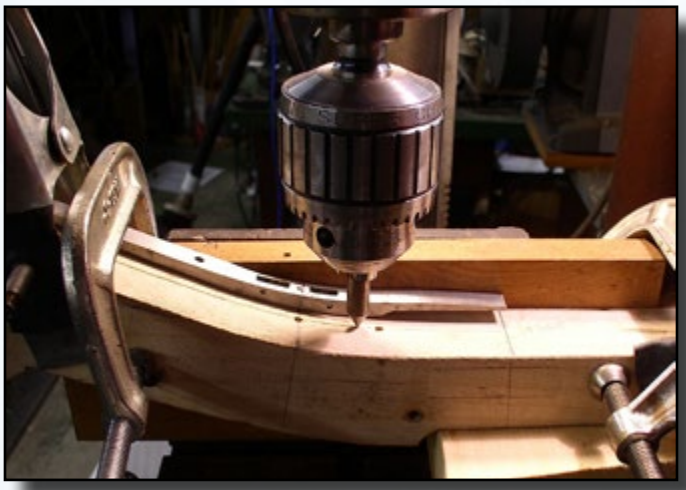


Fig. 2. The massive angle plate has been faced with a board to prevent stock contact with its much-abused surface. A centerpoint mounted in the drill chuck is the only reliable way to index on the centerline of the stock. I do a dry run along the whole length of the line to make sure the milling table travel is indexed to it.

I am partial to L&R T1300 or R.E.Davis #0009 Hawken triggers. Both have ½" wide plates. With my old system, my initial cut is 7/16" wide; that allowed a bit of wiggle room if corrections had to be made. With my current system with the stock clamped to the angle plate, I can use a ½" bit with full confidence. Finally, I come back and finish up the mortise to the required width and depth for the internals **(Fig. 3)**. You don't want to take out more

Fig. 3. The milled trigger plate mortise still needs a bit of handwork, but at least 95% of the wood has been removed. During removal of the remaining wood, that gives it some place to go . . . a big factor when cutting a deep, long mortise.

wood than necessary, but free movement of the parts is crucial to safety and reliability. You can get so fussy about cutting a tight inlet that you become a victim of your own success by pressing the plate into a mortise that won't release it. Luckily, you can turn a #10-32 bolt through the mainspring screw hole down against the bottom of the inlet **(Fig. 4)**.

Fig. 4. A tightly fitting mortise can make you a victim of your own success. Luckily you can back out the plate by turning a #10-32 screw down through the mainspring screw hole against the bottom of the mortise. Trying to pry out a long inlay like this can wedge it deeper into the mortise if what you do straightens the inlay. Note that the plate swells a bit forward of the trigger slots. That can be removed by filing down to wood level to match the smooth curvature of the wrist.

Ideally, the triggers are positioned in the guard to allow about a 1/8" free travel behind the rear trigger **(Fig. 5)**. That allows plenty of room for even a gloved forefinger to enter without brushing the trip trigger. The trigger plate is

Fig. 5. Leaving a 1/8" of free play behind the rear trigger gives plenty of room up front for a gloved finger. I love that straight, early style grip rail that hugs the plate to give plenty of solid griping area. It appeared frequently on both fullstocks and halfstocks during the J&S period. (Baird 2)

drilled and tapped for screwing in the guard stud (which may or may not be threaded for you). If not, thread down as far as the die will go. Then reverse the die to run full thread down as close as possible to the bow. There may still remain a shallow thread or two. You can remove that with judicious use of a triangular die-maker's file. Before

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threading the plate, I have always countersunk the hole just a bit **(Fig. 6)** to allow for close fitting of guard to plate.

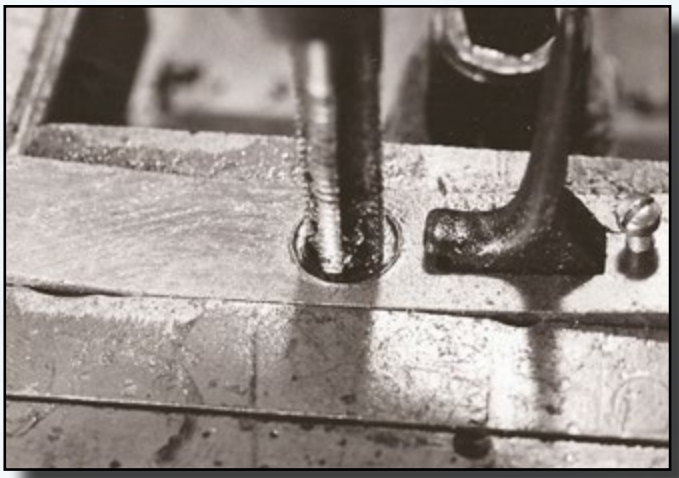

Fig. 6. I countersink the tap hole a bit before threading to reduce frictional interference from the plate when turning in the guard stud.

You want the guard to turn tight just as the grip rail reaches alignment with the plate **(Fig. 7)**, but of course, by this time, you have realized that the curvature of the

Fig. 7. Nope, it isn't going to turn in tight unless you solve the interference from the front end of the plate.

plate will not allow the guard to screw in tightly **(Fig. 8)**. There are two alternatives: either cut off the interfering end of the plate, which is superfluous but frowned upon by the purist, or heat it red hot (with triggers and springs removed of course) and bend it up out of the way. After the guard is closely fitted to the plate and the scroll of the grip rail secured by a #6-32 flat head machine screw through the plate, heat and bend it back down to align

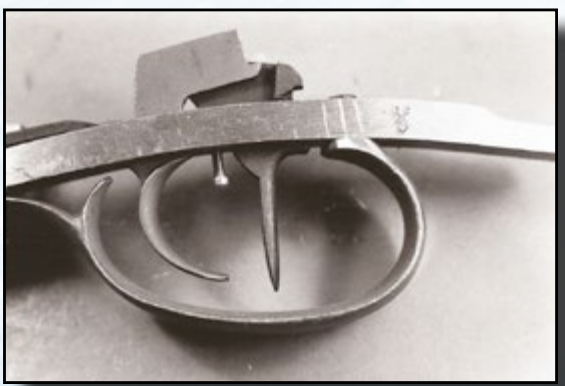

Fig. 8. There! That's a nice tight fit flush against the plate with no free play.

with the belly of the stock. The guard will still have about 150° of free arc, but cannot be removed completely without re-bending the plate. It's your choice as to how to solve this problem.

That was half the fun. The other half will be bolting the barrel tang through the wrist to the trigger plate via two #8-32 oval head machine screws. The trick is to get them exactly centered on both ends and at 90° to the surface of the tang **(Fig. 9)** Even a little bit off-center looks bad, particularly on top of the wrist, so a strategy must be employed to prevent the clearance drill bit (a #18) from wandering off from its desired destinations, which are holes tap-drilled with a #29 bit in the plate. It's not so easy to do that precisely just by eyeballing, because it is amazing how much a long slender bit can wander going through curly maple or burl walnut. The bit needs to be aligned with its destination.

Fig. 9. For best appearance, these screws must be aligned properly through the long Hawken tang.

There are at least two ways to do this. Quite a few years ago, I devised a homemade drill guide jig **(Fig. 10)**. Unbeknownst to me, Scott Coy had concurrently devised one for the same purpose, albeit much more adjustable and sophisticated. After I published my version **(Stutzenberger 65)**, Scott contacted me and generously sent one of his improved drill jigs as a gift. I have used all three. They are great for installing patchbox latch push rods (very demanding of precise drilling) or for guiding a drill to a pre-drilled hole on the other side. I think his guide is marketable, perhaps even patentable, but I have not heard of progress in either regard.

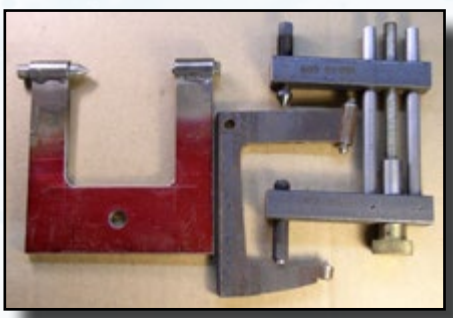

Fig. 10. Two versions of my drill guide, consisting of a pilot concentric with a point, are shown on the left. Scott Coy's improved guide is on the right. All are adjustable, but the one in the middle is most suitable for drilling holes for patchbox latch pushrods.

If you have a drill press, you don't need an ingenious drill guide. I first learned this method from Buchele *et al.* (74), published about 40 years ago. The procedure has three major steps:

1.) Drill clearance holes in the tang (#18 bit) and tap holes (#29 bit) in the trigger plate where you want them

to be joined by tang bolts. The holes in the tang should be drilled at 90° to the surface of the tang for best appearance, which puts them at an oblique angle to the trigger plate.

2.) Mount a stationary pointer on the drill press table that is concentric with the drill chuck. With an inexpensive XY milling table, this is achieved by the mere turn of a handle. Mount the rifle on one or the other of the trigger plate holes **(Fig. 11)**. Drill down a little over half way through the wrist using the tang hole as the pilot. Likewise drill the other hole.

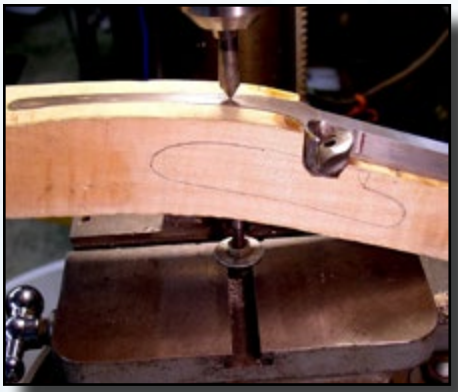

Fig. 11. Here is a mock-up of the rifle's position between the stationary point locked down on the drill press table and the center point in the chuck. The forestock is supported on the roller stand.

3.) Turn over the rifle and mount it on one of the tang holes, then drill down through the tap hole in the plate until the bit breaks into the clearance hole. Repeat at the other set of holes. Remove the trigger plate and clearance drill completely through with a bit that will allow passage of the appropriate tap (an 8-32 is standard). Run the lubed tap in from the tang side. Proceed cautiously by backing up the tap after every half turn to clear chips. I leave the threaded ends a bit longer than necessary at this time.

Now for our final bit of fun. On a halfstock rifle, the under-rib takes the place of the thin web of wood between barrel channel and ramrod groove in a fullstock. Installing the rib, aligning it properly with the entry thimble and drilling the ramrod hole without interference from the massive under-lugs creates a bit of angst in the novice Hawken builder. Assuming you already have the lugs in place on the bottom of the barrel lay your rib on the barrel and lay a piece of 3/8" rod in its groove. The lugs I make are a very sturdy 0.190" high and the standard rib is 0.220 thick, allowing a skinny bit of clearance for the 3/8" ramrod hole **(Fig. 12)**.

Before attaching the rib, the forestock cap must be in

Fig. 12. By clamping a straight 3/8" diameter rod in the rib groove, you can tell how much ramrod clearance you will have over the lugs. Note that I filed off a corner of the forward lug to clear the full cast return thimble (described in Fig. 18).

place. There are two general types of cap, formed sheet metal and solid cast **(Fig. 13)**. Both are available in iron, brass and German silver. Both types have their advantages

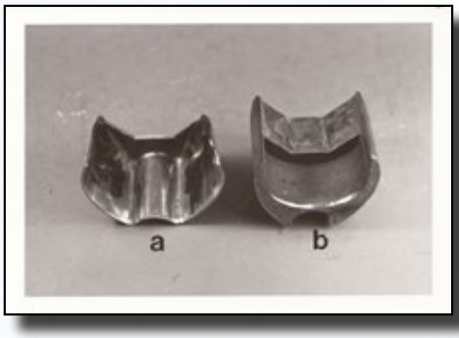

Fig. 13. Inside comparison of (a) sheet metal versus (b) cast forestock caps. Note the much heavier construction of the cast cap and the chamfering of the mating edges to facilitate a press-on fit.

and disadvantages. Sheet metal is easier to re-form a bit to fit a tapered barrel, but if you fiddle around too much it will work harden and it is impossible to re-anneal because heating will loosen the end cap. Cast caps can be filed to accommodate a slightly larger barrel, but sidewalls are pretty thin as cast. They are sturdier than sheet metal. The Hawken Shop (suppliers) offers an alternative cap that encloses the ramrod and eliminates the need for a separate entry thimble **(Fig.14)**. Whatever kind you install, form the forestock carefully so that the cap fits squarely against

Fig. 14. An alternative cap is offered by the Hawken Shop (see suppliers). Their cap encloses the ramrod and eliminates the need for an entry thimble.

its shoulder. Fill the cavity with *AcraGlas™* or other strong epoxy and press firmly into place with a three-pad edging clamp **(Fig. 15)**. There are at least two different types of under-rib: one is solid (good) and one is a flimsy stamped thing that requires closure by soldering at the muzzle end **(Fig. 16)**. I'm sure there are others with cross-sectional differences (see suppliers). I was told many years ago that the Hawken Brothers sometimes used the stamped rib on their cheaper "squirrel" rifles. I can believe that, considering its squirrely appearance.

Ribs are attached by solder or screws or rivets. I have seen old halfstock rifles with ribs attached via four or five rivets. I can imagine a soft copper rivet staked into an undercut hole in the barrel and branded over into a countersink in the concavity of the rib would hold nicely. I have used a low-temp silver solder (*Hi-Force 44*) that is very strong (28,000 PSI tensile strength) and easily applied providing you can bring enough heat to bear for uniform solder flow

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Fig. 15. The only effective way to press a cap to full, sustained contact against the forestock shoulder is to apply a three-pad edging clamp. If AcraGlas or other epoxy bedding agent is not used to secure the cap, thread in a flat head #2-56 machine screw.

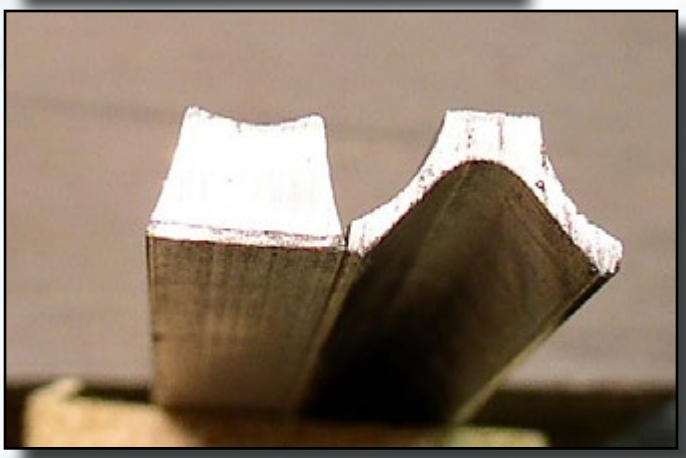

Fig. 16. Two types of ribs used on halfstock rifles. There are several cross-sectional variations to the solid extruded/drawn rib on the left. When attaching the rib to the barrel via screws, by all means employ a drill stop to avoid damaging the bore. See Part I.

while tinning the barrel. Screw attachment is easier and fraught with fewer pitfalls. Plus, there is no mess to clean up. However, attachment with screws (i.e. #2-56 x 3/8" slotted flat head) requires precise control of drilling depth to avoid venting the bore. Make a simple little depth stop like the one featured in Part I. That will absolutely not let you ruin a $250 barrel. It's not something one should attempt with a hand drill after a three-martini lunch.

Once the cap and rib are in place, inlet the entry thimble into the stock. There are variations here **(Fig. 17)**: the solid cast version is the sturdiest, but is a bit of an adventure to inlet. The milling table on my drill press comes to the fore at that. I start out with a 3/8" ball end mill centered on the muzzle cap groove. After routing full length, I switch to a ½" router bit to remove 90% of the remaining wood. The final step employs a 5/32" end mill to cut the channel for the pinning tab **(Fig.18)**.

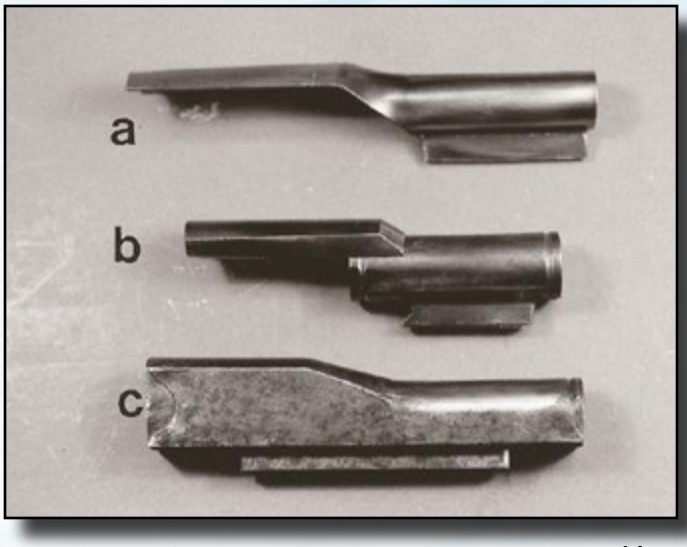

Fig. 17. Any of these entry thimbles will work on a Hawken: (a) the traditional return sheet metal cap used on longrifles, (b) my home-made turned & machined two-piece version and (c) the sturdy cast version that requires much more mortising.

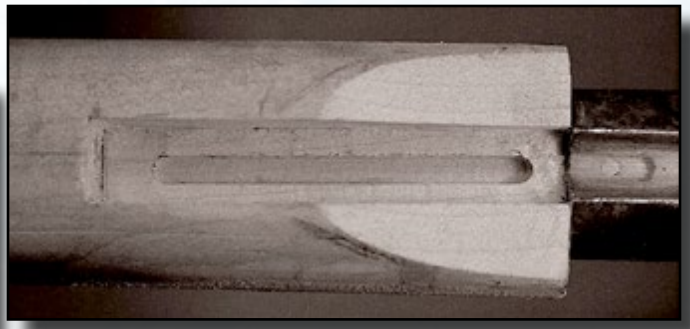

Fig. 18. The solid-cast return thimble requires a humongous cavity that is best milled out on the drill press or milling machine.

The final step is the attachment of the forward thimbles to the rib. My 3/8" ID thimbles are turned from 7/16" mild steel rod. Flats are milled on the thimbles to correspond to flats on the rib **(Fig. 19)**. This provides a large soldering surface. The mating surfaces are tinned and the thimbles placed in their recesses. I used to align the thimbles by

Fig. 19. The final stage of rib installation is thimble attachment. Note that the thimbles have been turned to match the cast entry thimble and milled to match the flats on the rib. The red lay-out dye provides a contrast to keep old eyes from making mistakes.

insertion of a solid 3/8" rod. Now, to prevent heat bleed-off during soldering, I have replaced the solid with a straight section of all-thread rod **(Fig. 20)** that reduces area contact with the thimble. The ends of the all-thread are clamped down tightly into the ramrod groove of the

Fig. 20. All-thread rod serves a dual purpose of alignment and clamping pressure without drawing away a lot of heat during soldering.

Fig. 21. The rib is held in the vise between padded inserts. The ends of the all-thread rod are clamped down into the rib's ramrod groove to center the thimbles on the rib flats. Now to clean up my workbench . . .

rib **(Fig. 21)**. Heat is applied to the underside of the rib by a propane torch at a distance from the thimbles. That lets the heat gather gradually under the thimbles without scorching the flux. The all-thread has little surface contact with the inside of the thimbles while keeping the thimbles aligned with the ramrod groove of the rib. Cleanup is minimal and I never have had a thimble come loose.

In summary, this article has given detailed instructions to avoid the major potential pitfalls in constructing a Hawken halfstock Mountain Rifle. All the methods described here have been thoroughly tested over 40 years of making such rifles and the mistakes associated with them. Nevertheless, these methods are the expression of just one man's perspectives. By all means, visit: http://www.thehawkenshop.com/images/instructions.pdf for alternative methods that are just as valid as those expressed here.

Acknowledgments

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Suppliers

Brownell's Inc., 800-741-0015, brownells.com, for *AcraGlas*™ bedding gel and a complete range of gunsmithing tools.

L&R Lock Company, 803-481-5790, http://www.lr-rpl.com, for Hawken locks and triggers

R.E. Davis Company, http://www.redaviscompany.com/locks.html, 419-833-1200 for a wide assortment of locks and triggers

The Hawken Shop, 360-679-4657, Oak Harbor, WA, https://www.thehawkenshop.com/furnishings.htm, for Hawken kits and hardware.

Track of the Wolf, https://www.trackofthewolf.com/ for a wide range of muzzleloading rifle parts and tools

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