Inletting The Swamped Barrel

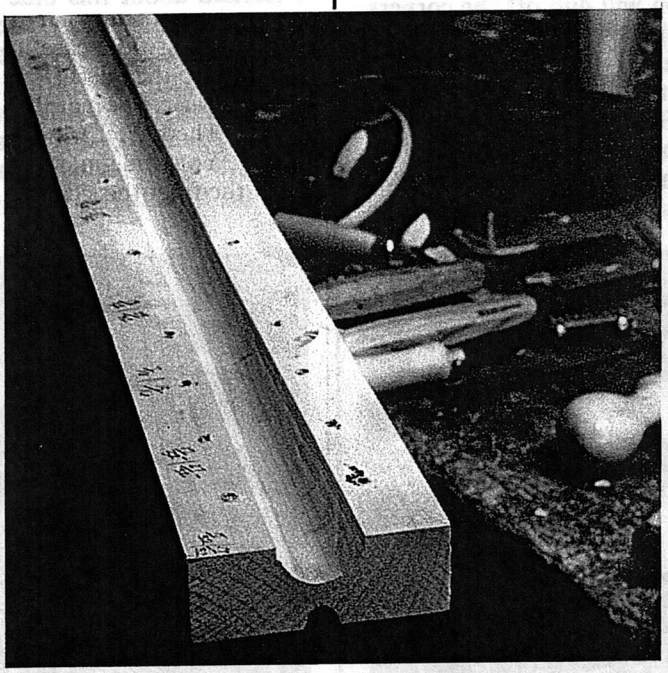
Part II

by J. Bivins, North Carolina

Last month, we completed two-thirds of the fearsome task of inletting a swamped barrel, using a most traditional method. Let's finish the job.

What we've accomplished to this point is providing a very precise inlet for the side flats of the barrel alone. Now we must excavate the bottom three flats. Of course, if we want to follow one other tradition in American longrifle making, we might choose to do that the fast-and-dirty way, and just fit that octagonal tube into a round inlet. A very high percentage of old rifles were so done, so why not? Because it's *bad and lazy*. Bad, because the bottom oblique flats of the barrel don't rest against wood, and that means a weak forestock--precisely the reason that so many forestocks on old rifles look ever so much like a cunningly-contrived bundle of curly maple kindling. Let's do it octagon, and keep that fragile, thin wood well supported.

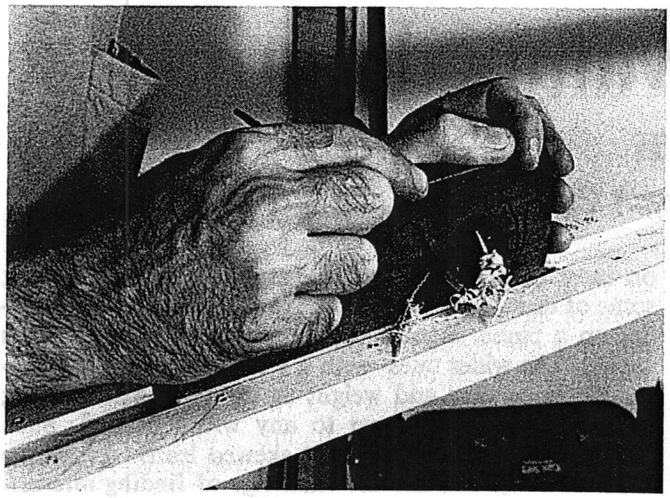
Now's the time to remove the hardware. All those rail screws come out much easier than they went in, and the rails can be stacked in the corner. So how do we make that round gutter into an octagon shape? Well, the old boys liked planes. As a matter of fact, they used planes for a great deal more stockmaking than we do now. They used them to true up blanks, for inletting barrels, and for shaping the stock. Sure, we like our patternmakers' rasps and Surform tools, but nothing much more sophisticated than farriers' rasps and half-round bastards were available for stockmaking two centuries ago. Despite the nonsense published here and there, planes will cut curly maple very handily. Several planes with octagon irons still survive to document such use for barrel inletting. A good barrel inletting plane should have a fair amount of mass to run well and not chatter. Making one from scratch is no easy matter, but it's the best thing to do if the time's available. Since time is a commodity I've ever been short of, I've taken the easy way out. Various firms sell wooden-bodied rabbet planes, or they can be obtained in antique shops. They're not totally ideal for the purpose, since their irons have a much lower angle than that considered desirable for working hardwood. They are all side-ejectors, which is necessary on most planes with narrow irons. They aren't cheap; some of them push $20, but that's still cheaper than making up a plane. Rabbet planes are available in various widths. The wider ones--with a 1 1/4" iron, say--are preferable since they add weight to the tool. The running surface can be cut down to any width needed. Such planes have both straight and skewed irons. Avoid the latter unless you'd like the challenge of finding *interesting problems* in shaping the iron.



The stock blank with the inletting rails freshly removed.

Even with a straight iron, converting a rabbet plane to an octagonal barrel-inletting plane isn't so simple a matter as just scribing off an octagon on the iron and then grinding away. One must consider the angle of the iron first, or the cuts which the iron makes will leave the angles of the oblique flats quite funky indeed--certainly not octagonal. In the absence of some system of geometry which eludes me, I've found it easy enough just to make up a scribing gauge. True up a block of hardwood that's about the same width as the plane iron, and with a bit less height than the body of the plane. File or plane one edge to a true octagon, or at least as true as you can make it. Strike a line on the side of this gauge that's *exactly* the same angle as the iron of the plane, and then saw off the gauge on that line. The gauge may now be laid on the plane iron and the correct angles scribed off. It'll look pretty funny, with oblique angles seemingly much steeper than they should be. The iron may then be ground to these lines, preferably using a coarse belt on a belt sander--and plenty of water handy to avoid drawing the metal. New bevels for the oblique flats should be ground on and stoned up, retaining the same angle as the original bevel.

The bed or sole of the plane can then be dressed off to an octagon shape, which is certainly easy enough. For inletting swamped barrels, it is possible to use two sizes of planes, but I haven't found that the work is speeded up by doing so. I've just elected to use one size which is slightly under the smallest diameter of the barrel being inletted. My other inletting planes are for different sizes of barrels. In any event, the bed of the plane should be the same width as the iron, which will likely mean that →



Planning the octagonal bottom of the inlet, using the modified rabbet plane illustrated in the last issue.

you've left shoulders on the sides of both the iron and the plane body or stock, which is fine.

In order to plane as close to the breech as possible, the plane needs to have a "bull" nose. That is, there should be very little plane body in front of the iron. If the stock is cut back, however, you risk breaking off the nose right into the throat the first time the plane smacks solidly into the breech of the stock blank. For this reason, a bobbed plane nose must be reinforced. Drilling all the way through the nose from bed to top and gluing in a 7/16 section of straight-grained hickory ramrod is good enough if a little care is exercised in using the plane. Why not a 3/8" steel rod, you say? Plain stocks shrink and expand across the grain with changes in humidity. A piece of ramrod will move very little longitudinally, but a piece of steel not at all. The wood is more compatible.

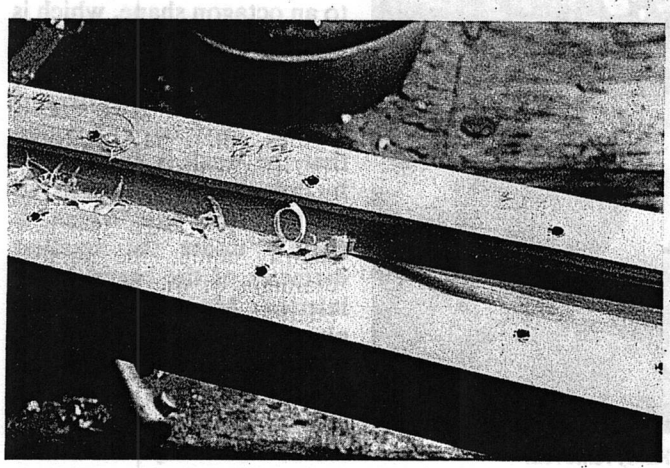
In starting plane cuts, care must be taken not to tip the plane, else the edges of the iron will dub off the corners of the narrowest section of the barrel inlet. The iron should be set quite fine, certainly no more than 1/32" above the bed when you turn the plane over and squint down the bed from the nose. Some planes run well with an even finer set. A rank set--the iron projecting too far--will cause chattering and tearing. When setting the iron, don't try to beat the wedge out of the plane breech (the mortise for the iron). Instead, use a rawhide mallet and give the *plane body* a few smart raps right in front of the iron. The resulting vibration of the plane body will loosen the wedge.

The plane may be used to cut within a hair of final depth. At the breech and muzzle, the narrow iron will of course leave a cut that is considerably smaller than the finished inlet must be. In the long section of the inlet that represents the smallest diameter of the barrel, the cut will be close to the finish shape. Even though the cut is much too small at the breech, the iron nevertheless has established the correct angles of the oblique flats. Finishing the inlet, then, requires a certain amount of painstaking work with a 3/8" flat chisel, which is used to "push" those flats toward the outside of the inlet, widening them at the same time.

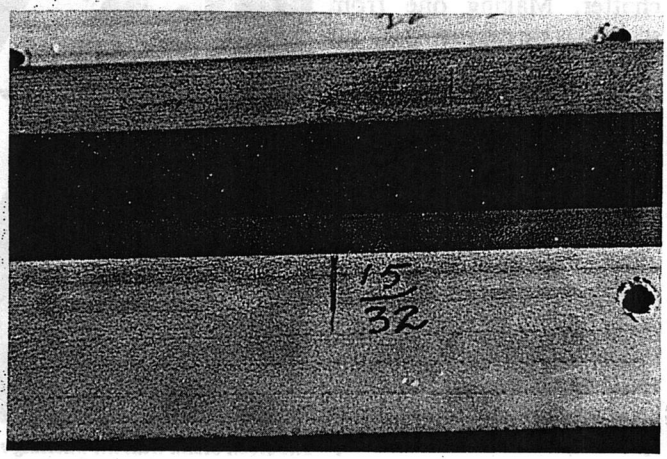
This rather tedious finish inletting is of course complicated by the fact that the depth of the bottom flat must be constantly monitored. That's where the drilled holes for depth checking are the handiest, though using a depth gauge is no great matter. Another method is to use a square, placing the "point" of the square in the center of the inlet; when the beams both contact the sides of the inlet at the top surface of the stock, the you've reached the bottom. However, this demands that the barrel is to be sunk precisely to its center line, and I don't bother with such fussiness.

After the bottom flats have been given their initial shaping with plane and chisel, the barrel must be spotted in, and this is the part of the job where you find out if your really want to be a good gunstocker. For a spotting agent, I used to use plain linseed oil, since it shows well enough on maple. It's scarcely visible on walnut, though. I dislike black stuff in an inlet, though the carbon from a candle flame is certainly effective. Instead, I prefer to use the non-drying Prussian blue sold in tubes by auto supplies, and use a stiff bristle brush to coat the bottom flats. I learned about this blue goo from Monte Mandarino, who has been known to use it effectively on a job or two.

One must take care in the initial phases of pushing a barrel into the inlet. Don't allow it to become cocked. It's best to push down at the breech first, and then work forward. The barrel will resist entry, but don't be faint of heart. Your side inlets, thanks to the rails, are so precise that the fit at the side flats is very tight indeed, and that's



A 3/8" flat chisel is used to open up the oblique and bottom flats.



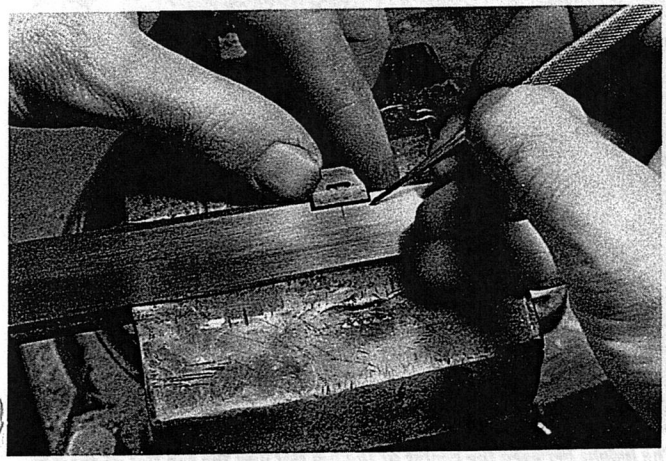
The inletted barrel.

the way you want it. Removing much wood there at this stage would spoil the inlet. If certain sections of the sides appear to be too tight, and they will show burnishing if they are, slide an "00" cut 3/8" pillar file back and forth inside the inlet, just using your fingers to push the file lightly against the wood. Easy does it!

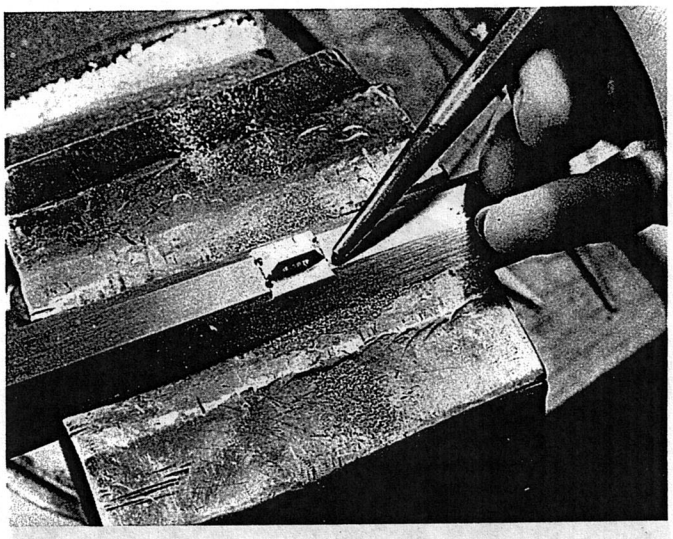
After a certain amount of such fussing, the barrel will reach the point where it can be pushed into the inlet a significant degree, and will begin to bottom out in a number of places. The effort required to seat the barrel in the inlet should be quite firm, almost to the point of being a little scary. After giving the bottom flats their first coat of inletting blue-or whatever you choose to make use of--carefully set the barrel in the inlet, push it down hard with your hands, and then push it down the rest of the way in several places by squeezing it down between the vise jaws. Only moderate pressure on the vise handle should be used, for it's relatively easy to bend a barrel in the process of inletting it. Believe it; I've bent several. All you want is for the barrel to firmly contact the bottom of the inlet for a good reading, so that the high spots can be pared out with the 3/8 chisel. I use no flat rifflers for this purpose, since they jam up so badly. If you're so inclined, however, you can make up an octagonal rasp by raising teeth on three flats of an old barrel stub with a flat chisel. The stub can be casehardened and have a dogleg handle fitted to it. Such things are best for smoothing cuts, and load up too much when they are used for cutting away much wood.

Seating the barrel to full depth, then, follows the time-honored business of spotting, paring, spotting, paring, until the thing is all the way down at the breech, and you feel like lying down on the floor. You'll likely wind up above the center line of the barrel, but that's no matter, since the top of the stock is easily reduced. More on that anon. I make no attempt to achieve 100% bearing of all three bottom flats, but instead satisfy myself with perhaps 75% bearing. When I've reached that point, I scrape out all of the traces of inletting blue. A riffler can be used for this purpose to achieve a smooth finish, but scraping suits me well enough, and saves on the horrendous expense of buying bent rifflers which don't last very long. Wood is abrasive.

The one area which should show 100% bearing is the breech. See to't, or you risk damage later. As for the rest



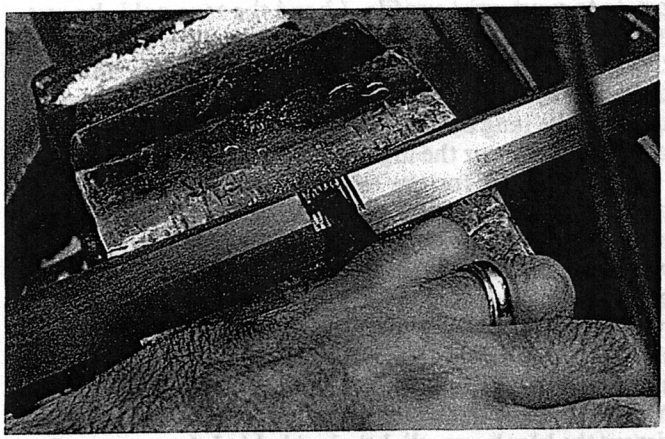
The lug positions are scribed on the bottom flat...



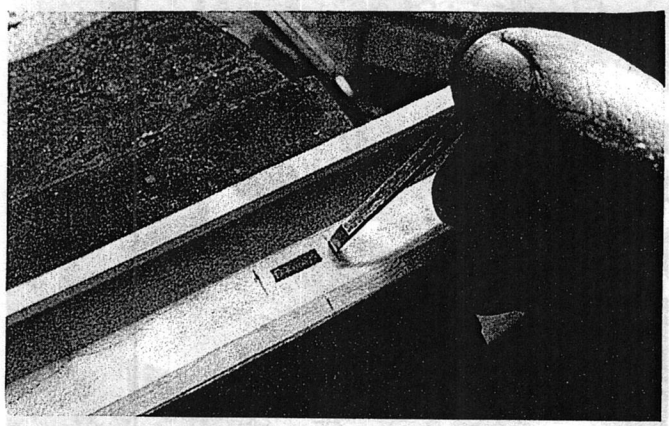
Lugs may be staked in place with a center punch, though this is not really necessary except on lugs which are to receive sling swivel screws.

of the barrel, it should fit the sides and bottom so firmly that when the barrel is in place, with no fasteners of any sort, the stock can be held by the butt with the muzzle point down, and when the side of the forestock is rapped at any point, the whole thing will have a solid ring to it. If the stock sounds dull and hollow, or rattles a bit when struck, you've been a bit heavy-handed with the tools. That deserves a smart rap on the knuckles with a ramrod, and three days of nothing but sweeping the shop. The barrel should fit tight enough so that when the stock is inverted and given a smart smack, the barrel will loosen slightly, but not fall out.

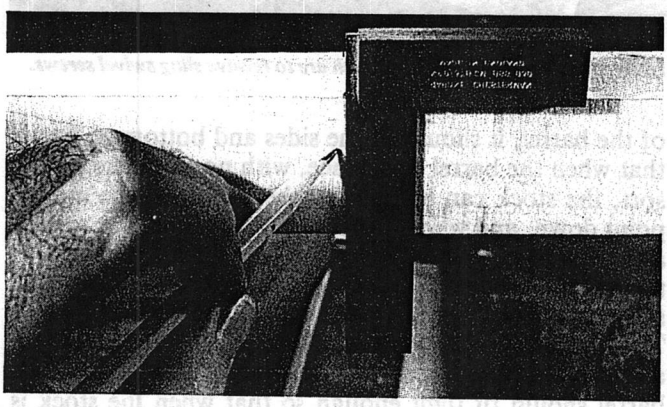
I should mention that the proper method of removing a barrel on either a new rifle or an old one is to rest the top flat of the barrel on the bench and gently start the barrel out at the muzzle by light down-pressure on a dowel inserted into the muzzle. Then, while lifting up on the forestock a few inches behind the muzzle, begin rapping on the stock with your knuckles to loosen the barrel. As it begins to move, shift your grip on the forestock further toward the breech, rapping all the while. A mallet can be used instead of the knuckles on a stock blank, of course. The idea is not to just lever the barrel out of the stock, even though the blank may still have quite a bit of meat on it. →



...hogged out with a hacksaw, and then finished out with a chisel and files.



The barrel lugs are mortised into the stock...



...and their centers established on each side of the forestock with a square.

on it.

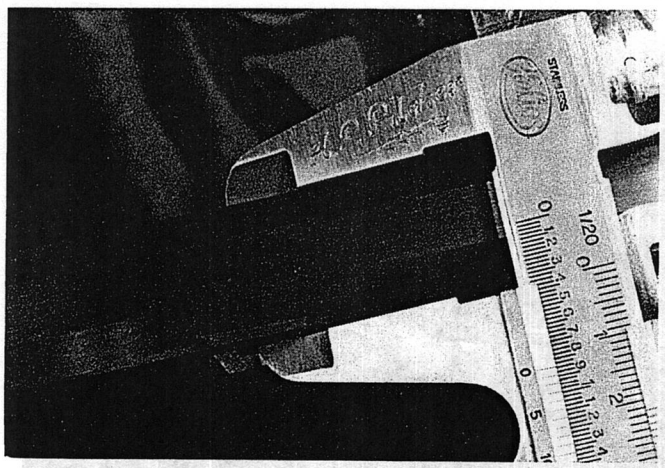
With the barrel firmly down, the breech plug may then be screwed in place and inletted. The lug of a breech plug must have a considerable amount of taper from top to bottom on the sides to facilitate good inletting, and the sides of the tang should have plenty of inward draft for the same reason, even at the back of the tang if it's square. The tang itself should be no more than 1/8" thick; some barrel and breech makers make the tang much thicker, but that serves no good purpose and in fact causes excessive removal of wood where it's needed most. File the offending thickness away before you start. A thin tang also facilitates bending the thing to the curve appropriate to your wrist profile. I bend the tang cold, by resting the bottom of the tang on the edge of the bench--with the plug screwed into the barrel--and then establish a gentle curve with a mallet. The curve also may be done by bending the tang by degrees in lead-lined vise jaws, beginning the bend near the lug and working slowly back.

I cut the inlet for the tapered lug first, so that I can push the whole business down and scribe the inlet for the tang. While the sides of the lug should bear firmly against wood, take care that this fit is not too snug, for the taper of the lug provides a very efficient wedge that can very readily split a stock blank. The back of the lug, which should rake forward toward the bottom rather than being a right angle to the axis of the bore, should have 100% bearing against the wood when the plug is seated. I *undercut* the blank very slightly just behind the tang, so that the rear tip of the tang is just bearing lightly for the first 1/16" down from its surface. That will prevent possible chipping behind the tang later should the stock shrink longintudinally and leave a gap behind the rear surface of the barrel breech and plug.

After the barrel and breechplug are fitted, I strike off a line on top the stock blank 1/4" from the barrel flat on each side of the barrel, the full length of the forestock. This line should follow the curve of the barrel. Using either a rip saw or bandsaw, I then cut away all the excess forestock on both sides of the barrel, pulling the saw out at the area on each side of the breech corresponding to the area where the lock will be inletted. Removing this waste now will obviate having to drill through an unnecessary amount of stock wood later.

The methods used to fasten the barrel to the stock, regardless of the system employed, must allow for the inevitable bitchiness of Ma Nature, given shifting humidity and its effects upon wood, no matter how well it's sealed. I prefer dovetailed tenons set into the barrel no more than .040 deep. I don't care for the staked-in wire-type tenons; it's altogether too easy to bump up a little knot inside the bore with one of those, especially on the small dimension of the barrel. If tenons for pins or wedges are to be formed from sheet, then 1/16" mild steel should be used. 1/16" brass stock is also all right, but I prefer to run silver solder into the lug joint if I use brass in order to provide more strength. In either instance, the usual "T"-shaped lugs should be made so that they can be dressed down to a height of about 5/32" after they are mounted on the barrel.

Fitting lugs on a swamped barrel is not the sort of thing worth setting up on a milling machine. The dovetails can be cut by hand in less time than it takes to figure out how to clamp a tapering tube in a mill vise. For barrels 42" or longer, I use four lugs, the first spaced just behind the position of the rear thimble, and the last lug very little more than 2 1/2" from the muzzle. The other two lugs must be spaced in a fashion that does not interfere with the later location of ramrod pipes. Placing the lug on the bottom flat, I scribe off two lines equal to the width of the top flat of the lug--that is, the narrowest width of the male dovetail. Using the depth gauge on a vernier or just a simple scratch-gauge made up from sheet stock and casehardened, I strike off a line on each oblique flat to indi-



The height between the center of the lug slot and the top flat of the barrel is established with a vernier...

cate the approximately .040 depth I intend to cut the female dovetail. The bottom flat of the barrel, of course, serves as a guide to run this line; a bit of cold blue or layout dye swabbed on the oblique flats is a help in making this line visible.

The dovetail cut may then be hogged out, first with a series of cuts made with a 32-tooth hacksaw, and then with the same 00-cut pillar file used for cleaning up the sides of the barrel inlet. The dovetail cuts themselves are of course done with a three-square file. I prefer a longish one for better control, and belt-sand the teeth off of one flat to make it "safe." All of the initial cutting of the dovetails is done with the safe flat down. In order to get a sharp corner in the dovetail, I finish up by turning the file over, with the safe flat up. This will permit you to file the dovetail "floor" flat all the way into the corner, which is necessary since the file tends to rise slightly while making the heavy initial cuts in the corners. If this is not done, a gap will be left under the lug after it's installed. The lug should be a tight drive-fit. After it's driven in, I file off the excess on both sides so that they are flush with the oblique flats, then file off the excess on top of the male dovetail on each side, and dress the lug itself down.

In order to allow for longitudinal movement of the stock, the lug must be slotted enough to allow at least 1/16" of gap on each side of a pin or wedge. If this isn't done, changes in weather may shift the point of impact of the rifle, or even bend a pin. If pins are to be used, the lug may be slotted either before or after they're installed. Lugs which are to receive wedges need to be slotted from the first. In either case, the bottom of the slot should be flush with the top flats of the male dovetail. For pins, I use .079 round spring stock of the sort available from Brownell's, and if I slot the lugs before drilling the stock blank for the pins, I make the slots a little undersize in height so that they can be cleaned up later should the drill run out a little. Slotting is easily accomplished by drilling a hole at each end of the lug and cutting out the waste between with a jeweler's saw. A handy gadget used for holding the lug while this is being done can be made up from an old piece of barrel. Cut a dovetail in the piece of barrel stub, making the dovetail somewhat oversize so that all of your lugs will slide in easily with only finger pressure. Then take a hacksaw and make a cut straight down in the center of the dovetail slot in the barrel stub,

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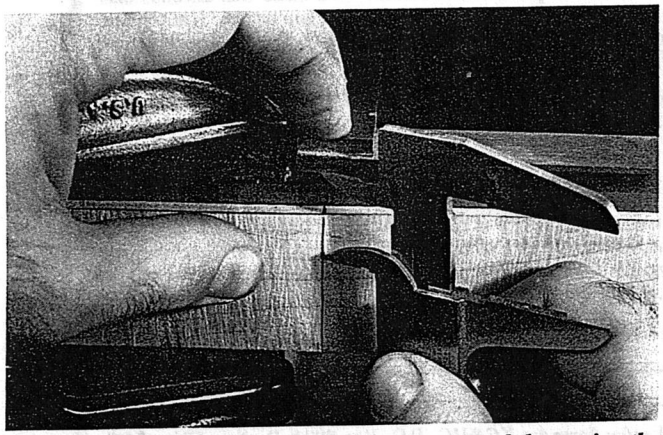
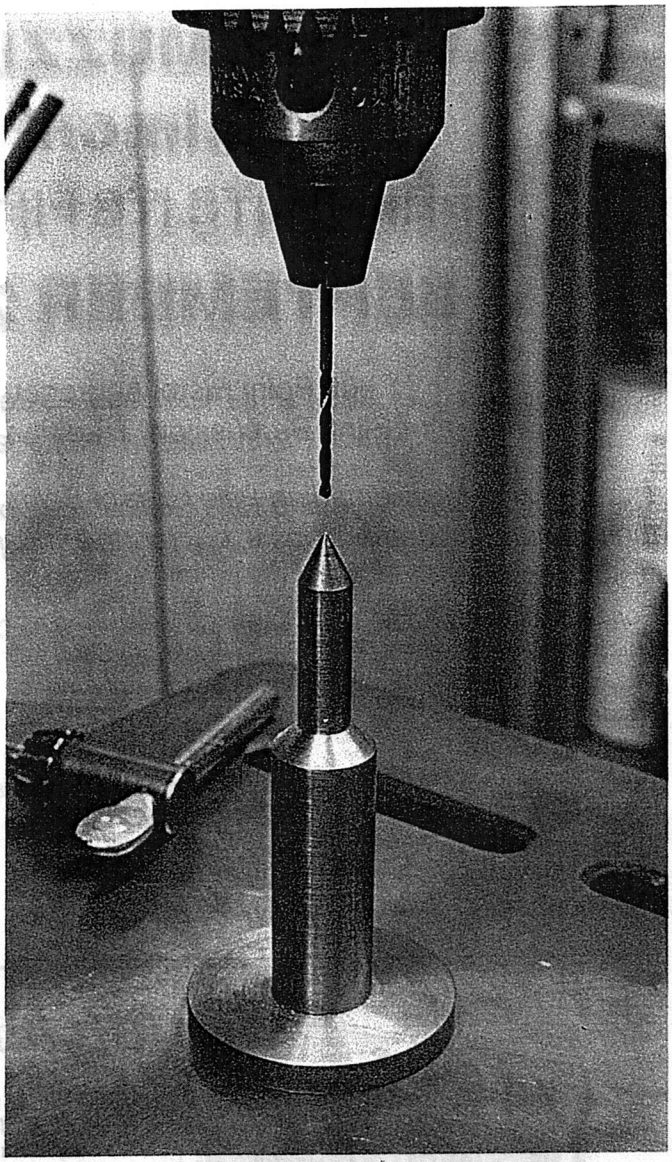
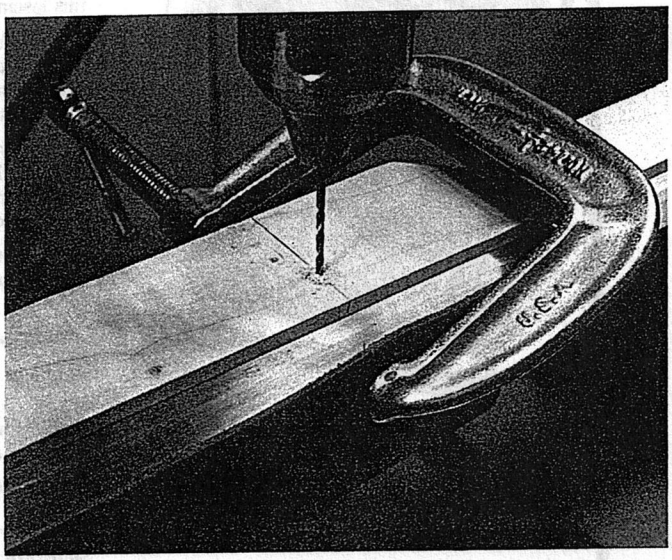


...and then transferred to the stock using a square and the vernier; the barrel should be clamped into the stock.



Bivins' rig for drilling on centers...



...which is used by setting the centerpunch mark on one side of the stock on the point of the bottom center, and drilling most of the way through from the opposite side, using a drill press.

Swamped Barrel

(continued from page 27)

cutting about three-quarters of the way through the stub. When a lug is pushed into the dovetail, the barrel stub can be clamped end-for-end in the vise; the vertical hacksaw cut will allow the vise to mash the stub enough to grip the lug tightly.

The positions of the mortises in the stock which will receive the lugs can be marked easily by just swabbing inletting blue on the bottom of the lugs. Placing the barrel in the stock, push the whole business together with your hands to "print" the four impressions. With a pencil, extend the end of each of those impressions so that a minimum of 1/16" of gap is left in the stock fore and aft each lug, for the same purpose that we slot the lugs themselves. We don't want the stock shrinking into those lugs and binding things up; even the flimsiest of forestocks can flex a swamped barrel. The lug mortises may then be chiselled out by first "stamping in" the lines on each side of the lug with a wide flat chisel, and hogging out the mortise with a narrow one. Even though I like a slim forestock--no more than 3/4" in height--I do not cut the mortise deep enough to show in the bottom of the ramrod groove. Most old rifles do have the lugs mortised all the way through from top to bottom, but very few old guns have excess slot at each end of the lug, either. I don't like looking at holes, so I leave the mortises blind; with a 5/32" lug, there's no need to cut through, though the wood at the bottom of the lug will be very thin indeed.

I've drilled many a pin hole by eye, but there's a better way if you have a drill press, and that's drilling on centers. Here's how it goes. Using a square, strike off a vertical line on each side of the forestock corresponding to the center of each lug. Then, with a vernier, measure from the top flat to the center of your lug slot (or the center of where the slot will be). Since on a swamped barrel this dimension will vary at each lug, I make a handy reference for each lug by just pricking a piece of cardboard with the points of the twin beams on the vernier which are used for measuring inside diameter. Placing the barrel in its inlet, I then C-clamp the barrel just forward of each lug position. With one beam of the square resting solidly on the top flat of the barrel, those same pointed beams on the vernier can then be used to prick both sides of the stock on the vertical line you've already established. Deepen these prick marks with a centerpunch.

Now for the holes. When using .079 pin stock, I drill with a number 47 drill, which is .078; that leaves a snug fit for the pins. I place the drill bit in the chuck, and lower the quill so that the point of the drill is centered on the point of my bottom center, which as you can see from

the illustrations is a lathe-turned affair designed to fit in the center hole of the drill press table. It has a threaded shank below to permit tightening in place by the use of a nut and a large square steel "washer" which contacts the webbing under the table. The same thing can be done, of course, with nothing more than a sharp 40-penny nail shank gripped in a drill press vise that is dogged down with clamps. My center is a bit faster to set up, but that's its only advantage.

With this rig, you just can't bollix up a hole unless you pull down on the drill press quill like a frustrated gambler hauling on a slot machine handle. With the bottom center resting in a centerpunch mark on one side of the stock, the drill is run through the mark on the opposite side, drilling about three-quarters of the way through the stock. The hole is finished out with the same bit running in a hand drill. You'd best have a bit of help to steady the stock when you drill the hole nearest the muzzle. If you're using wedges instead of pins, a series of three or four holes must be drilled, and a slot in the wood opened up later with chisels and flat needle files; a coarse warding file is perfect for the job.

So there 'tis. If you're using pins, and haven't slotted the lugs yet, now's the time to do so. I should mention that if you intend to install a sling, and have fitted an extra lug for that purpose, that lug must also be slotted to allow travel of the swivel screw. I use a Number 6 screw for swivels, which means that the swivel lug must be taller than pin or wedge lugs, and you may well have to mortise it through into the ramrod groove. In order to prevent any possibility of a stock being broken by a swivel-screw lug being pulled out, I always stake such lugs in place very firmly.

Using this method of drilling barrel pin holes, it's not difficult to perceive other applications for the system. I use it for drilling tang screw holes, for it works beautifully even when the tang screw must be →

Whispering Pines Cap and Flint Club, Inc.

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We hope to see you all at our August 17, 18, 1985 rendezvous.

angled quite a bit. In order to insure a concentric countersink for the tang screw head, I countersink the tang while the screw hole in the trigger plate is still resting on the bottom center. Drilling on centers is also fine for the "side nails" or lock screws, but I don't use it for drilling thimble pins since I never install thimbles until after the forestock is shaped out. When drilling the rear lock screw hole, the barrel should be removed so that the drill bit--usually the tap drill--won't strike the angled side of the breechplug lug and run off. The lug can be drilled or slotted after the clearance holes for the side nails have been run.

With the barrel installed, now's the time to remove excess material from the top of the forestock. I use a No. 50 patternmaker's rasp for most of that, taking care to keep the files at an angle to the stock; cuts made perpendicular to the stock will of course chew up the precious corners of the inlet. I finish with half-round bastards and garnet paper wrapped around a block. Never allow the forestock to conceal more than half the barrel. In fact, a rifle looks a good deal more elegant when the upper line of the forestock is *below* the centerline of the barrel perhaps 1/32" or a little more.

All done! Now for the lock.... If you hit a snag, give me a call at (919) 748-0275 any evening. All letters arriving here are still fluoroscoped to see if they contain money or free stock certificates, and then thrown away if they do not. ●