

Basic Gunstocking and the Flintlock Rifle

PART ONE

LAYOUT AND INLETTING

By JOHN BIVINS

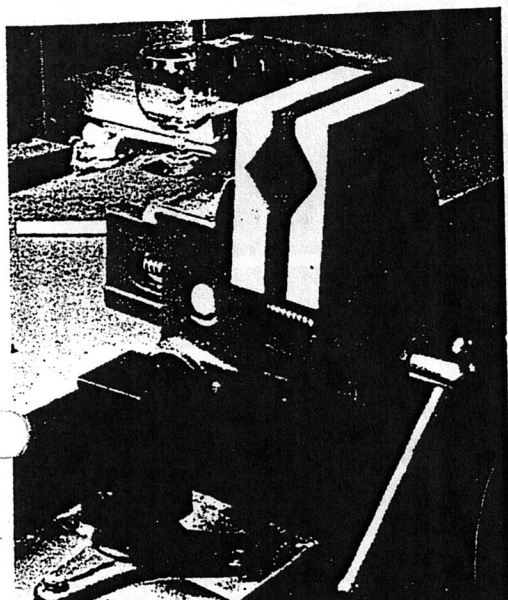
OVER THE PAST several years we've been rummaging around the gunsmithing bag pulling out various tales, jumping from one process to another with no particular sequence to things. For example, in *Rifle 37* we covered the hand inletting of a swamped barrel; in *Rifle 38* lock inletting was discussed. *Rifle 51* covered the design and installation of the patchbox, while No. 44 reviewed relief-carving techniques. In *Rifle 47* stock finishes were hauled off the shelf. Other articles aired such things as lock assembly, metal finishes, *et al*, and all the while I've been meandering around the basic bush of laying out and shaping the gunstock. We'll cover that

area of the "art and mystery" of the gunstocker in this issue of *Rifle* and also the next one to follow, since the subject covers entirely too much material for one issue. In fact, I'll be able to use only a third of the photos shot for "basic gunstocking" in the two *Rifle* issues, and we can't cover every tidbit of information here.

Many of you have written, called, or caught me at a shoot to ask if our material on gunsmithing and the muzzle-loader would all be brought together at some point. I can now tell you for the record that it will, in fact, be published in book form in 1979 by Brownell's. The material will, of course, be expanded to book length, covering a great deal more ground and using many more illustrations... all to be wrapped up in a big 300-plus page affair that Frank Brownell's crew will have to deal with. The *Rifle* articles have enabled me to get a massive amount of photography out of the way in preparation for this, and served as well as a sounding board for reader response. That sort of thing is vastly important to me, whether the criticism is positive or

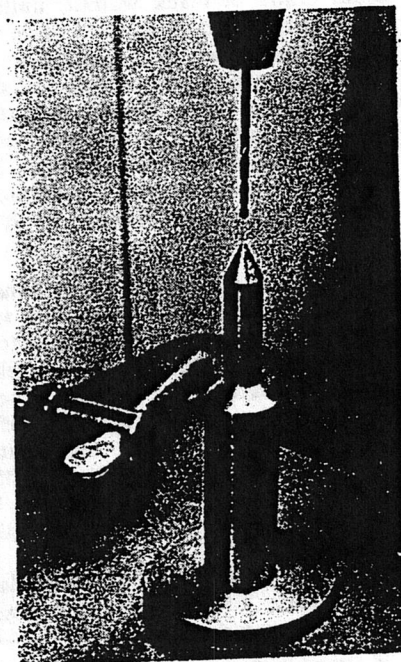
negative, since *no one* has all of the best methods for doing something.

A central premise to me in gunstocking is the desire to carry out every phase of the job as well as the next. A fellow should be just as proud to show off his barrel or lock inletting as he is fine carving or engraving. Decoration on a gunstock is the final icing, so to speak, and it's not too tasty an item if the cake is rotten inside. I've seen too many otherwise fine rifles that were "face" jobs to overlook this little editorial comment. Various states-of-mind bring about gnawed and cavernous lock mortises under gorgeous skins; I suppose some rush their work to get to the "goodie" part, while others just seem to live with the idea that it's fine if muzzleloaders are a little crude around the edges. 'Taint so, friends. Fine custom muzzleloaders cost every bit as much as fine custom centerfires, and if they are to be used, or even looked at, they should be equally as soundly made all the way through, or they aren't worth the powder it would take to blow them to that renowned section of the Nether World.



One of the handiest tools in stock-making is the Versa-Vise, which rotates on both horizontal and vertical axes. Bivins has fitted this one with maple jaws. [Editor's Note — We have not determined the purpose of the wineglass.]

Drilling for barrel pins, tang screws and lock bolt holes is done on centers, with the aid of a turned center, as shown, which bolts through the drill press table hole.



The beginning of our current game is the stock blank, from which we'll remove everything which doesn't look like a longrifle. You are better off if that stock blank is still in the board, for then you can lay out a stock to suit you. If you buy a piece already blanked out to an oversize pattern, either have a close look at it first hand or order it from a dealer who is reputable. Perhaps the greatest curse of the gunstock is to have what Al Linden called "musket grain" in the wrist. That is, grain running out at an angle rather than flowing parallel to the upper and lower wrist lines. In order to make the wrist grain straight, a stock must be laid out at an angle on the board in most cases, which of course is a nasty waste of fine wood that some less scrupulous wood dealers are loath to bear. Won't make any difference, they say. No? I have a friend who has *twice* broken his fine flintlock through the wrist just by trying to seat tight balls in a dirty bore. . . and I suspect that a 1/2-inch steel rod now rests through the middle of those breaks and all that grain runout.

Don't be tempted to buy a soft piece of maple for a gunstock, no matter how fine the figure. If you can make a significant dent in the stuff with your thumbnail, leave it be, or you'll have to live with crumbling, broomy inlets and a miserable medium to have to carve. Good maple — preferably sugar, but red will do if it's hard — is dense and heavy, and the best wood usually has a good deal of color, often with a pink cast to it. Wood that is dead white is often soft and worthless. Black walnut and black cherry were also used for longrifle stocks, as was birch (often mistaken for apple), though less often. Birch is ugly, but works well; I don't use it, and I won't use black walnut unless it's all butt wood with tight, short pores and of considerable weight. The usual grade of black walnut, unlike its flossy European cousin, won't carve worth a toot, and some of it is lousy to inlet. Cherry has poor shear strength and shares the long, open pores of black walnut, and is even broomier to carve unless considerable figure or root wood is present. Since *juglans regia* is neither available nor appropriate for longrifle stocks, stick with hard maple.

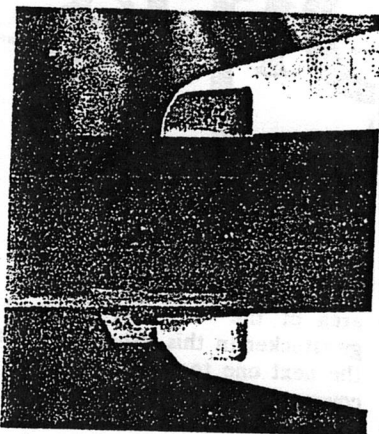
In choosing a gunstock, always consider wood-working quality and density to be more important than any of Mother Nature's neon displays of fine fiddleback figure. Check a blank by cutting across the grain with a small gouge to see if the wood fibers tear rather than cutting cleanly. If the cut is clean, with a furnished appearance, you have the best stuff you can get — wood that will make a rifle so good that knowledgeable gun people will not even notice if there is *no* figure. Sure, I like pretty curls too, on girls and gunstocks both.

If you're fortunate enough to be able to

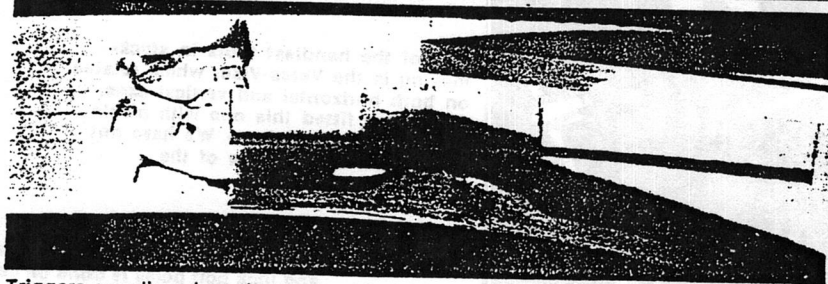
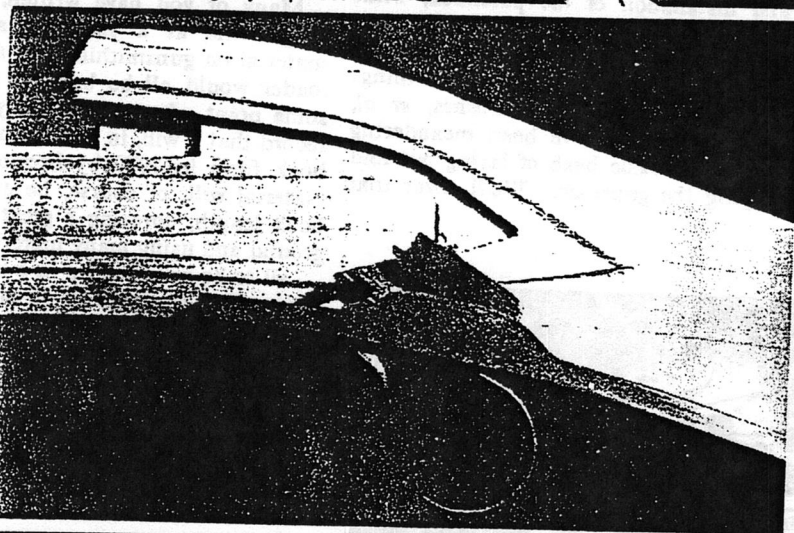
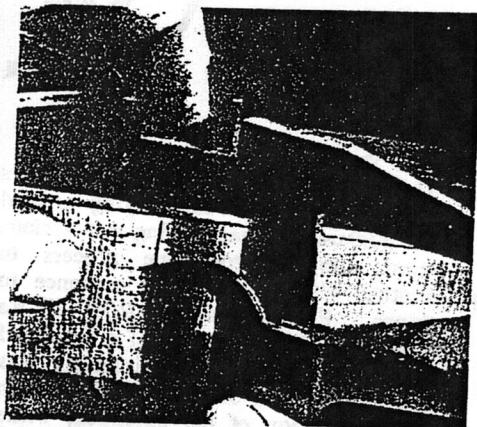
cut your stocks from the board, work from a planed surface on both sides of the board so that minute surface imperfections, insect holes, and grain direction can all be easily spotted, and so the sawn blank will have squared sides. For best results, make an oversize stock pattern of Plexiglas, since this will allow you to see without question how the grain is running. Also, needless to say, when purchasing stock wood, look the dealer in the eye and ask in a flat and hard tone if the wood is dry; see if his left eye twitches or his feet shuffle a little. Wood is frequently kiln dried much too fast, which is another

reason a board should be planed before layout. A rough-sawn surface can hide small surface checks caused by too-rapid drying.

We have no room here to discuss the vagaries of style in the longrifle stock; each gunsmithing school in the early days had its identifiable architecture, and these profiles are available in the books and occasionally even in blueprint, some of which are excellent. Whatever style you prefer, I'd suggest that you avoid any design which commits you to an exaggerated "Roman" nose or excessive drop at comb or heel, unless your specialty is muscular contortion and you particularly relish having your cheekbone viciously massaged every time you shoot. Many early designs will allow adjustment of buttstock dimensions to a usable set of



In locating barrel pin centers, the distance from the top flat of the barrel to the center of the tenon is measured with a vernier caliper, above, then transferred to the stock as shown at right, with the barrel clamped tightly in place.



Triggers are aligned on the stock with the sear position of the lock before the trigger plate is inlaid, as in the upper panel. [Note that this rifle is for a left-handed shooter.] The plate is then inlaid, taking out no more wood than necessary to provide clearance for internal features.

figures. . . with the exception, perhaps, of Bedford rifles, which seem to have the plummeting stock drop of an ancient petronel. If you are locked in on a "school" design in both architecture and furniture, don't hesitate to take your brass buttplate and alter the pitch of the thing with a mallet to better suit shootable stock dimensions. And what are such figures? Well, unless a customer has a particular set of dimensions in mind, I make my longrifle stocks with 1 3/8 inches of drop at the comb, 3 to 3 1/8-inch at the heel, 3/16 to 1/4-inch castoff, depending upon thickness of the cheek. A pull of 13 5/8 to 13 3/4 inches

is good, since muzzleloaders don't have a great deal of recoil, and I use a negative pitch at the butt which will position the muzzle some 13 inches away from a vertical surface against which the heel is resting. Except for the pitch, perhaps, these are good shotgun dimensions, and will instantly position the sighting plane at the eye when the piece is thrown up by most people. Except for a certain friend of mine who has a frog-like neck.

Even though I have patterns, I often lay out a blank with nothing more than a tape measure, pencil and long straight edge. For the latter I use a stainless T-square from which the head has been "lost." You need something at least three feet long, and a yardstick won't do, since the edges aren't precise. After laying out a stock, I bandsaw the thing out 1/4-inch oversize all over except for the top of the stock where the barrel inlet is to go, and I don't bring the pattern right down to the line until after the barrel is inletted. This way you can absolutely verify your drop dimensions off the top flat of the barrel before inletting the buttplate.

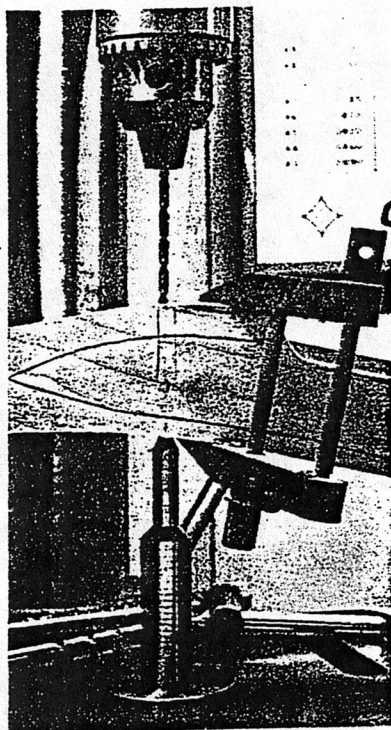
Depending upon your stock style, and therefore thickness of cheek and amount of castoff, the barrel centerline may be placed on either side of the stock blank center to suit you, if the blank is thicker than you need. If the blank is of marginal thickness, and you need castoff, the barrel may even be angled on the blank. In any event, establish a master centerline for the barrel, and from this centerlines for both upper and lower buttstock surfaces. If

you are to have castoff, begin the cast with a line that begins about 2/3 back on the wrist, and extend the line to the point at the heel where the full cast occurs, say 1/4-inch (or whatever). Draw this new butt centerline in on both comb and lower side of the butt. Center your buttplate on the line to verify that you have ample wood left for a cheekpiece; this is especially critical in an early style rifle that must be made from any blank that is less than 2 1/2 inches thick. It's best to start with enough wood in the first place.

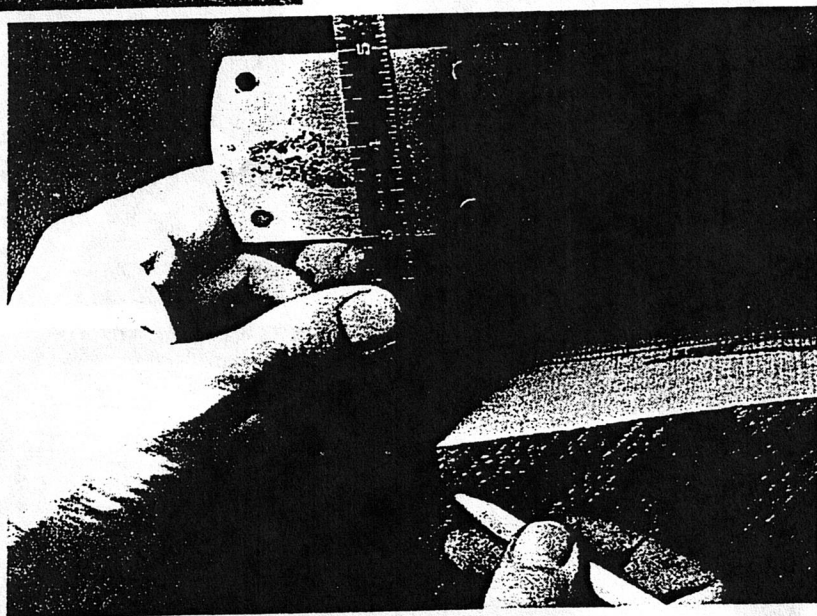
Inlet the barrel as we discussed in *Rifle 37*, or if you are using a straight octagon barrel, the simplest thing to do is rout it in with Mr. Stanley's Finest. Many muzzleloading dealers offer blanks already routed for various sizes of straight barrels. I suggest that you don't buy one that also has the ramrod groove routed and the hole drilled, since that will tend to predetermine dimensions that you might not want to live with. Whatever you do, don't ever buy a blank with the ramrod hole routed out from inside the barrel channel; that weakens the stock and a rap on the thing sounds like a cheap cored door on a tract house. Ugh.

All right. Our procedure from here is as follows: inlet barrel and tang, install barrel tenons and pins (or wedges), inlet the lockplate, inlet trigger plate, install tang screw, inlet the buttplate, rough out the buttstock, inlet lock internals, and trigger internals. Cut ramrod groove, drill ramrod hole, rough out fore-end, install muzzle cap. If any of this order sounds perverse to you, you'll see as we go along why it's not.

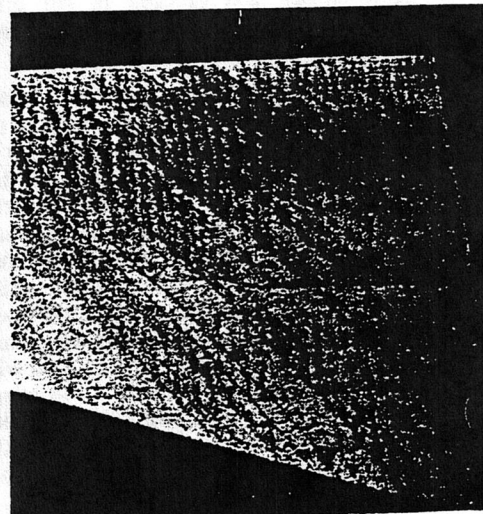
Whether you use pins or wedges to hold your barrel in its inlet (we'll discuss pins here for brevity), you must use barrel tenons that are slotted, with at least 3/32 inch of slot on each side of the pin or wedge. These may be either folded from sheet brass or steel, or bought already slotted. The reason for slotted tenons is that wood is subject to considerable



The tang screw hole is drilled with a tap drill, between centers, using the center post.



The drop and comb line are verified before final trimming, with the aid of a T-square blade, which indicates the bore center line. The butt plate contour is then marked off, as at right.

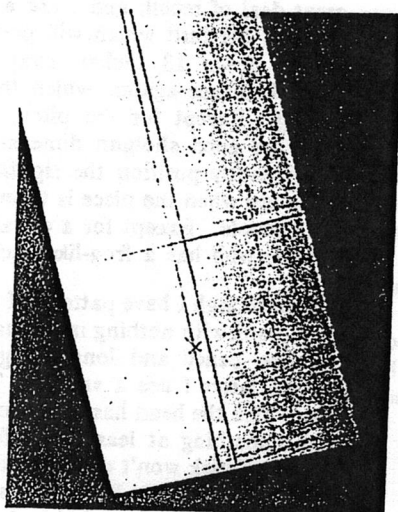


longitudinal change with differing conditions of humidity, and often highly figured wood, especially fiddleback, is subject to rather extreme movement. I've had forestocks lengthen as much as 5/32-inch from winter to summer, which is admittedly an extreme amount, but if you don't allow for *some* movement, you'll wind up with seasonal changes in point of impact at least, and a bent barrel pin and buggered forestock at worst.

If you can find access to a drill press, drilling the forestock for pins or wedges is a simple matter, and virtually foolproof if you use the method of drilling on centers. I had a center turned up that I bolt to my drill press table from below. This device is set up with the point of the pin-diameter drill touching the tip of the center, and the center is then tightened down hard. A big nail held in a clamped-down drill press vise will do in a pinch. With a vernier, measure the distance between the center of the tenon slot and the top flat of the barrel, checking this distance for each tenon if the barrel is a swamped or tapered one. Rather than recording these measurements, you can simply prick them lightly onto a piece of cardboard with the points of the inside-measuring legs of the vernier, if you like, indicating which set of prickmarks is for which tenon.

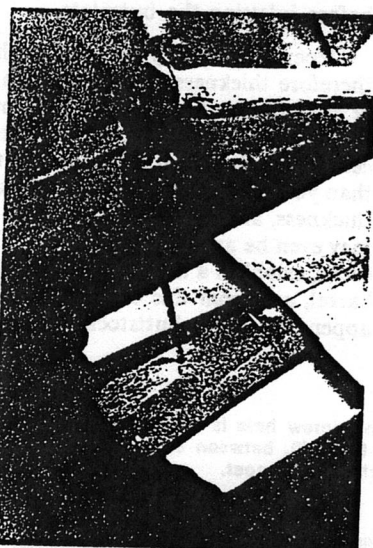
Now mark the forestock at the top where the center of each tenon will fall when the barrel is in the stock, and using a square, pencil this mark vertically down both sides of the forestock. Return the barrel to the stock, and clamp it firmly next to the first tenon position you are to mark. With a precision-ground straight-edge (I use the thick leg of a machinist's square) resting firmly on the top flat of the barrel, transfer your vernier measurement taken earlier to the stock by lightly pressing the point of the bottom inside-measurement leg into the wood. Make the same mark on the opposite side of the stock; both of the vernier marks are of course pressed onto the pencil line mentioned above. Center punch these light marks, and proceed to the other tenons, firmly clamping the barrel at each point.

The pin holes may now be drilled between centers by resting the point of the center in the centerpunch on one side of the stock, and drilling through the centermark on the other side. Set the drill press stop so that the drill does not quite contact the center point below, and finish out the hole with a hand drill. Always be sure that the stock is clamped for all such measuring and drilling, and you need not worry whether the drill will come out where you want it. The same method is used for drilling lock bolt holes and for the tang screw. A slightly different method must be used for round

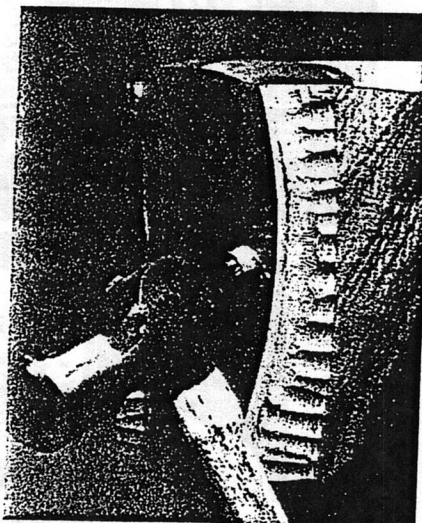
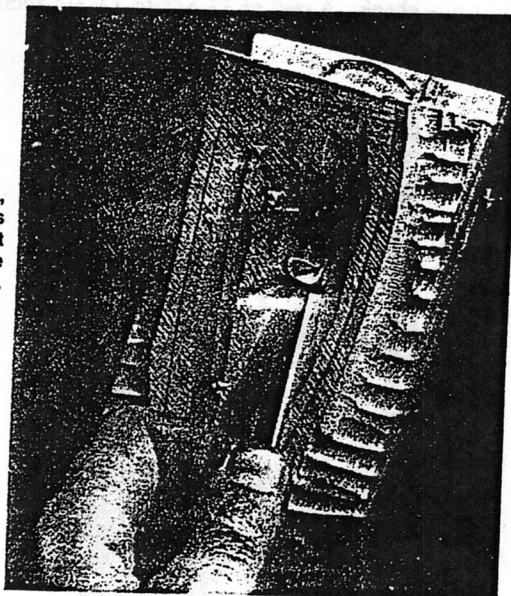


The stock centerline, and the castoff centerline [marked "X"] are drawn, and the front of the buttplate extension located. [This is a lefthand stock.]

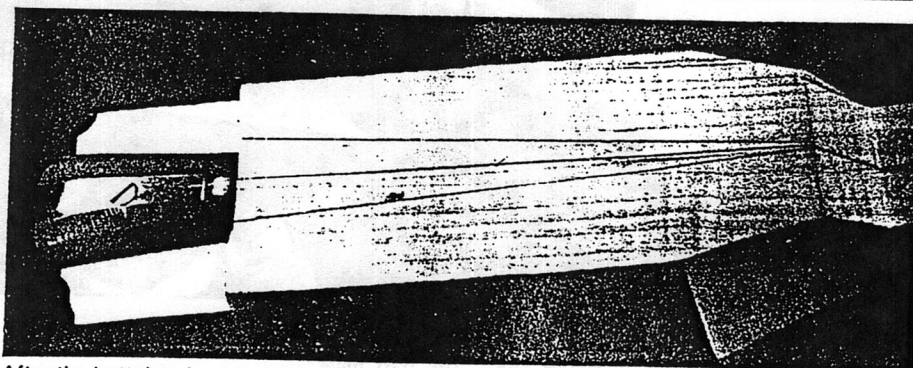
After the buttplate contour has been cut, surplus wood around the edges is removed, then "inside" wood in the inlet is cut out to avoid having to fit the buttplate to a large area.



The buttplate extension pilot screw hole is located, above; the pilot hole in the stock will be drilled slightly forward to provide a "draw-bore" hole.



The buttplate edges are peened against the wood for a final "smash" fit — a technique Bivins adopted after noting peening marks which hadn't been completely filed away on an early rifle.



After the buttplate is completely inletted, the comb lines are drawn off in preparation for final shaping.

Gunstocking

(Continued from page 25)

barrels, which I unfortunately haven't space to cover here.

For barrel pins, I use .079 round spring stock, and I drill the holes with a No. 47 drill, which provides a firm seat for the pin. I make the pins no longer than the diameter of the barrel, and file a slight taper on the end of each pin while turning it in a drill. Installed, such short pins are well shy of being flush with the finished surface of the stock, but they are excellent insurance that the pin holes won't ever be wallowed out.

With the barrel pinned in, excess wood on the sides of the forestock can now be sawn off. With a really thick piece, it's best to saw off the excess *before* the pinning operation, since you can drill only so deep with a small drill. I mark off the forestock with a pencil and simply bandsaw away all but 1/4-inch of wood on each side of the barrel, following the contour of the barrel if it's swamped. Saw all the way back into the lock area, angling the saw out when you reach the wrist area. This may be done with a sharp crosscut saw as well, with the barrel clamped in place and the stock held vertically in the vise.

I usually inlet the lockplate before installing the tang screw, since this provides a precise way of indicating the position of the sear, and therefore the trigger plate which the tang screw is to pierce. The lock is positioned so that the top of the pan falls on the centerline of the barrel's side flat; the center of the pan should fall 1/16-inch or slightly less in front of the breechplug face, since it's preferable not to have to notch the breechplug to clear the vent. This is why you should use a barrel that is breeched no more than 1/2-inch deep, or 5/8-inch at the most; having to notch the breechplug for the vent invites an uncleanable trap for all those gooey goodies left behind from burning black powder.

In positioning a lock, the tail may be angled downward slightly if needed, though care must be taken not to position the front of the lock too high when using a large diameter barrel (1 1/16 inch or more), since the front lock bolt needs to clear the barrel. You can, however, notch the bottom of the barrel for the front lock bolt if needed, though more than half the diameter of the bolt shank should seldom be necessary.

Before inletting the lockplate, take care that the side of the stock is square, and proceed with inletting as discussed in *Rifle 38*. After the plate is in, mark the position of the sear on the outside of the plate, and transfer this to the stock.

Before proceeding, you'll need to verify your stock layout lines and saw off the rest of the stock to its final trim lines. With your straightedge resting on the top flat of the barrel, check the drop at comb and heel with a ruler, and adjust any buttstock lines necessary. Bandsaw off all the excess outside your trim lines on both buttstock and fore-end, and re-establish both centerlines and castoff lines top and bottom. Extend the bottom centerline entirely to the muzzle, since this is to provide a guide for the ramrod groove. In laying out a fore-end, incidentally, I allow for a fore-end height of no more than 13/16-inch, measuring from the center of the barrel flat to the bottom of the fore-end. This will often finish to 3/4-inch after final shaping.

Now extend the sear position to the bottom of the stock, and with this mark, and the sear mark in the lockplate mortise, locate the trigger so that when installed it will be bearing on the sear no more than 3/8-inch behind the shoe. For a decent pull and best mechanical advantage, a single trigger should be pinned in the wood rather than in the trigger plate. If the trigger pin is low and well in front of the sear, the pull will be heavy. For a double-lever double-set trigger, arrange the assembled unit so that both rear and front levers will reach the sear. Mark the position of the front of the trigger plate, transfer to the bottom of the stock, and lay off the trigger plate mortise with a flexible rule and scribe. I should note here that all components which are to be inlet into a gunstock should have the edges beveled to facilitate tight inletting, and that is especially true of a thick piece such as a trigger plate. The high supporting lugs of a set trigger should also be filed down on the sides.

The trigger plate is then inletted. One easy method to remove a set-trigger plate while inletting is to simply turn in the trigger spring screw from the outside, and the screw will push the plate out; this avoids endless prying with screwdrivers and the like. After the plate is inletted, position the tang screw on the side of the stock at an angle that will permit the screw head to lie roughly parallel to the line of the tang; this will avoid the screw head ending up oval after it is filed flush. Center punch the top and bottom of the screw hole on the tang and trigger plate, clamp the whole affair together, and tap drill on centers as with the barrel pins. Also on centers, run the clearance drill through until you can feel the drill just touch the trigger plate, then tap the trigger plate while it is still in the stock to insure alignment of the threads. It's wise to also countersink for the tang screw on centers.

The lock bolts are installed in the stock in the same manner, though I suggest that you remove the barrel while drilling for these. One reason for this is that the

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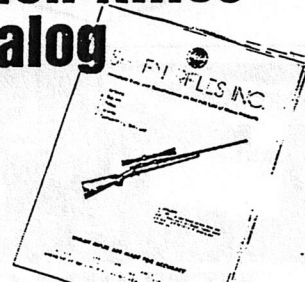
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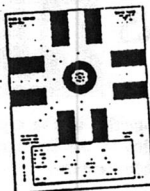
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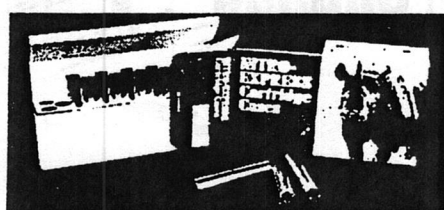
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rear lock bolt hole will usually fall in line with the rear lug of the breechplug, which usually has a slanted face, and the tap drill will tend to skid downward when it hits this surface. In using a barrel that is breeched 1/2-inch deep, and with a large Siler lock, I position the rear lock bolt hole 3/8-inch behind the barrel breech. I use 10-24 screws for both tang and lock bolts, since they aren't easily stripped.

Before beginning to shape the stock, the buttplate must be installed, since the buttplate has a great deal to do with the final shape of the buttstock. Since you now have cut the buttstock to its final trim lines, verify that your buttplate casting fits the pitch of your pattern; the top of the buttplate extension should align with the comb line with the buttplate toe falling where you want it. If this doesn't jibe, take a heavy leather mallet and bend the buttplate extension either up or down until it fits your pattern. Incidentally, a fair number of castings are twisted as they come from the foundry, so if the buttplate doesn't look quite true, chuck it in the vise and give it a twist with a big crescent wrench if needed. Now take a sharp mill file and clean up all the inside bearing surfaces of the buttplate; the edges of the casting should be razor-sharp all over when this job is finished, or you will end up with embarrassing little "walloons," as George Hoenig would call them, around the inletted buttplate.

Aligning the buttplate extension with the top of the stock, carefully trace off the profile of the buttplate onto the stock, taking care that it falls in the correct position to give the pull which you want. The top of the buttplate should drop 1/16-inch or less below the comb so that wood can be filed down to the buttplate, and you should leave 1/16-inch of wood at the front of the buttplate extension for safety's sake in inletting.

The buttplate inlet should be drawn on the right side of the stock for a right-handed rifle, and on the left for a southpaw piece, as shown on the rifle in progress, an iron-mounted piece for Buck Buchanan. The reason for this is that the rear of the buttplate cut should be angled for castoff, and this is easily done by simply tilting the bandsaw table a bit. The amount of tilt needed is determined by drawing a line at right angles to your castoff center line on the comb, laying the stock on the bandsaw table, and tilting the table until the bandsaw blade aligns with this. A quarter-inch of cast usually requires about 1/16-inch of table tilt. Obviously, a stock is cast off to the right for a right-handed piece, and vice-versa. Carefully saw off the back of the buttplate inlet, and then the cut where the front of the extension falls. Return the saw table to zero, and saw off the "bed" of the buttplate extension. Mark a centerline on the buttplate extension, and keep it

aligned with the castoff line on the comb while inletting.

I don't say dark incantations and haul out gallons of inletting black while inletting a buttplate, and I don't scrape and cuss for hours to get a perfect fit. I do get a perfect fit, but I use a hog-and-smash method to do it, and I just don't fool around with the job; time is precious. Forty-five minutes to an hour will usually do it.

The "hog" part comes with getting rid of all the areas of stock that slow down the inletting process. Lay the buttplate on the stock, pencil around it, and gouge away around the sides of the stock for a half-inch or so, leaving an eighth-inch margin around the plate. With a quarter-round gouge, concave the *inside* of the inlet somewhat, to within a quarter-inch of the plate edges. This gives you a much smaller bearing area to have to work with, which saves considerable time. Even on hard end-grain, a cabinet rasp may be used to remove most of the high spots during inletting.

Actual inletting begins with the buttplate extension, and I file, chisel, and scrape, spotting-in all the while until I have 100 percent bearing of the extension. Rather than using inletting black, I use linseed oil or just any clear oil handy, since I don't like inlets to look like a coal mine, and maple shows the imprint of a clear oil well enough. By the time your extension is bearing well, the buttplate should have begun to bear at the top rear and the toe. Proceed with the inletting until the toe is completely bearing for a distance of a half-inch up the buttplate. Now you are left with nearly a sixteenth-inch gap at several points around the center of the buttplate, right? You are supposed to keep scraping and spotting until these are all gone, right? Wrong. Now comes the smash part.

First, the buttplate extension must be fastened down. Centerpunch where you want the upper screw to go, and with the buttplate *off* the stock, drill through the extension with the correct pilot drill for the woodscrew you are using (I prefer 1 1/4-10's). Now put the buttplate back on the inlet, and insuring that its centerline matches that of the stock, drop the pilot drill into the hole, and with the buttplate pushed forward hard, tap the drill lightly with a hammer. Remove the drill and buttplate, and centerpunch a mark 1/32-inch in *front* of the mark left by the drill bit, and with the same bit, drill the pilot hole in the stock on that new center mark. This is the infamous draw-bore hole, and it will serve to make the woodscrew pull the buttplate extension tight against its forward inlet. *Don't* fail to do this, or you will have to go out and speak a few words to the mountains later. Clearance drill and countersink the extension, and screw the extension down tight. You should cut

the countersink by trial-and-error until the screw slot comes within a quarter-turn of lining up with the centerline of the rifle; when the job is finished the slot can be turned all the way over.

As I mentioned above, the toe of the buttplate should have full bearing at this point. Now install the lower buttplate screw, with its center at least an inch and a half above the toe to avoid weakening the stock at that point. Ring the screw down tight. Now, you say, what about those hideous gaps still left? Don't I have hours of work left? No. Pick up your ball peen hammer, and proceed to peen the edges of the buttplate down to the wood, giving the thing hefty but well-directed swats. A brass casting will pull right down with this method, leaving not even a hint of a gap anywhere. Don't, however, work too close to the toe with the hammer, and don't expect the "smash" method to work on soft wood; the wood will compress under your blows. This works equally well with steel castings or forgings, though requiring a bit more tapping, and we have found that it will work as well with a Neidner-type buttplate. On these, a punch can be used to avoid hitting the checkering with the hammer, and a curved riffler file used to file off the peen marks. In a longrifle buttplate, simply use a cabinet rasp to file off the evidence of the evil deed, and while you're about it, file those buttplate edges down thin. Thick edges on a buttplate look like thick ankles on a gal. If you're wondering how we came up with this method, I'll give you the straight facts. I found the remnants of some tiny peen marks on the buttplate of a carved Eighteenth Century American rifle. The stocker hadn't filed them all away.

Now you can pencil in lines for the sides of the comb and delineate the toe lines on the bottom of the stock. We'll take up stock shaping next issue.

We'll also go into tools a bit next time, but let me mention briefly here what I consider to be about the only really usable stocking vise available. It isn't by any means perfect, but it's ahead of the rest of the pack until something better comes along, and I've been using one for ten years now. It's the Versa-Vise, sold by Brownell's (I haven't found it listed elsewhere). The advantage to a Versa-Vise is that it can be side-mounted on a shaft that will allow it to tilt forward and back; a camming action locks the vise in position when it is turned up tight. This tilting motion is of enormous value in stockwork, since it allows you to position a stock in relation to your working light so that shadows along the stock will reveal contours while you work. In order to have the tilting motion, you'll either need to buy the optional "flush" mount with the vise, or make a vertical piece with a shaft attached as shown on the unit we set up for my latest banjo-pickin' journeyman, Bobby Denton. The vise jaws should be drilled and tapped and hard maple blocks sawn with "V" cuts installed. These blocks should have at least 2 1/2 inches of flat area at the bottom for holding stocks still in the square; the "V's" readily hold a rounded-over fore-end, and belting leather should be glued inside the "V's" to avoid denting a stock.

Now, if some enterprising person would just make a vise like this, but heavier, and with jaws that would swivel, we'd really have something. Woodcraft, up in Woburn, Mass., has a swivel-jaw vise, but it doesn't tilt. I'd give a big box of French amber flints for one that would do both!

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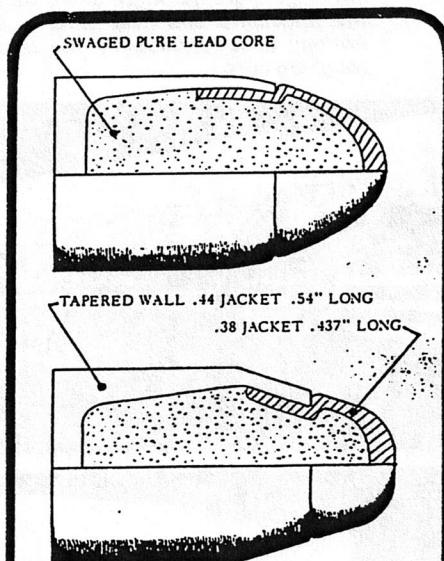
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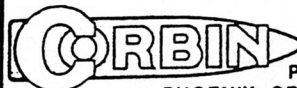
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