

Making and Remodeling Pistols Part III

By Fred Stutzenberger

Any way that works for you is the best way. There is no one method that is correct." (Clay Smith)



This barrel/stock combination has the makings of a nice Georgian Period pistol if I learn how to inlet the butt cap properly.

Clay's comment on the installation of the Early Georgian Period pistol butt cap was apparently correct, for I had never seen a published procedure on how to inlet those long tangs (also called *straps*) that reach almost up to the lock panel (Fig. 1). I took his comment and that fact as



Fig. 1. This fine brace of Georgian Period pistols has those graceful finials that reach all the way from butt to lock panel. Photograph used by permission of Salisbury Antiques Centre (info@salisburyantiquescentre.com)

an opportunity and a challenge. Judging from the many beautiful old original Georgian Period pistols that show up for auction at outrageous prices, that type of butt cap must have been standard equipment on the "best" guns of the day. Reaching a bit to speculation, I could imagine such a cap with those long finials might serve three purposes: reinforcement for the vulnerable cross-grain of the grip, a visual enticement to the eye to follow the sweep from the bulbous butt to the lock panel, and a pronouncement

to the world that these pistols were made by some craftsman who knew his business. In regard to the reinforcement issue, I routinely run a 1/2" diameter hickory dowel, surrounded by *AcraGlas*TM (Fig. 2) up through the grip from butt to the lock panel terminus. This article provides a suggested protocol for inletting the Georgian Period strapped butt cap.

A search of the Internet failed to yield step-by-step instructions as to how to get those curving finials in place along a graceful arc without gaps or going astray. Keith Lisle



Fig. 2. This reinforcement method has been used on two rifles with broken wrists. I put a 1/2" dowel in one and a length of 1/4" all-thread rod in the other. Very sturdy, doesn't show, and is prettier than a metal patch.

(custommuzzleloaders.com) and I discussed this project in detail. Keith and I have collaborated on several building projects and I enjoy getting a range of different perspectives that always provides viable alternatives. Here is his approach to inletting those long finials of the Georgian Period butt cap:

1. Finish the lock panels & carve in their thumbnails. If you don't do this, you will end up with gaps in the butt cap tang inlets. Any time I try to inlet through too much wood, I end up with gaps because I cannot make a plunge cut as accurate as I can scrape or slice a cut for a V-shaped inlet. Then I would carefully work the shape of the grip down to get a more precise fit.
2. Shape the pistol grip to within 1/8" of the finished shape. Slightly bevel the inside edges of the tangs so they will wedge down into the inlet.
3. Shape/bend the tangs on butt cap. The tangs must be malleable so they can be spread apart early in the process and then pressed into the inlet as the fitting proceeds up the stock. Some of those from suppliers are not malleable enough to work without annealing.
4. Cut the inlet for each side slightly smaller than the tangs being inlet. Slowly push the butt cap on with inletting black applied on the insides of the tangs. Then remove & trim out wood repeatedly as you proceed. This how I do my "Over the Comb" tangs that go all the way to the butt plate on southern mountain rifles. Push it in gently & take it out gently, cut-scrape-relieve the wood & repeat until it all fits in.
5. When you get to where the wood hits the cap at the base, you will have to blacken all the cap inner surface areas & relieve both tangs & top & bottom of the cap edges too. You could put parallel lines up each side to use as a guide if you are worried about getting it uneven, but I think you could just hold it out & see if it is straight or not.
6. I would not concern myself with the base of the cap being a full fit. Most of those caps are of substantial thickness. You have enough fitting to do without being concerned that the cup of the cap is full. You could fill with *AcraGlas* gel when you assemble it the final time. Remember you may never be able to get it off if you fill it with *AcraGlas*."

As you can see from the header, I had already gotten pretty far along on my Georgian style pistol. The butt flat of my pistol was roughed in at 1.87" wide by 2.48" long. The cup of the butt cap was 1.84" wide and 2.25" long. So I had scant room to spare in either dimension. At the risk of being called a "scaredy-cat" (I have been called worse), I decided to play it safe and work out the kinks of installation on a demonstration model rather than a pistol in which I had already invested time and money. To make it realistic as possible, I used black walnut, the same species of wood as my pistol stock (**Fig. 3**). To simulate the structure of a fore stock (something to hold in the vise), I drilled a 7/8" hole the upper end and glued in a section of broom handle then milled the butt section on the drill press to the same thickness as the pistol stock (**Fig. 4**).

The success of this protocol starts with the casting. Casting of the Georgian tanged butt cap must have a high reject



Fig. 3. The profile of my pistol butt was traced onto another piece of walnut.



Fig. 4. The shape and dimensions of this demonstration piece were milled to the same as those of my partially completed Georgian Period pistol.

rate because those long tangs are sometimes plagued with voids. When you receive yours, check it over carefully; voids even on the insides of the tangs will be weakened areas that may not stand up to the tap-tap-tap, in-and-out stress of repeated try & fit. In preparation of the casting, make sure that the little projections on the ends of the tangs are filled out. In the final fit, those little tabs will be keeping the tangs from flapping in the wind.

After inspection for quality, the next step is to file a bit of relief along all the edges just as you would with any casting. Having that relief helps the casting "cut" into the wood slightly at points of interference and facilitates a close press fit as the inletting proceeds. You may want to wait until the casting is annealed before relieving the edges.

In either case, the casting must be annealed to make it malleable. Skipping this step will definitely compound the difficulty of inletting the cap that is difficult even under the most favorable of circumstances. There are some

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misconceptions about annealing brass. Brass is different in its tempering requirements. Steel is annealed by heating to red hot followed by slow cooling in a non-conductive medium like fine wood ashes. Brass must be heated to at least 900°F and immediately quenched in cold water for maximal workability. If you don't have access to a controlled temperature furnace, check with the local tech school or potter-friends who have a kiln. Another method can be heating to red heat followed by cool air. Remember that the range of melting temperatures for yellow or red brass are 1710-1830°F respectively.

The butt cap castings that I purchased (see suppliers list) have a large round section protruding from the base of the cap. Apparently, this was a generous casting gate. It is very handy. Do not remove it at this point. You will need it later to have something to pull the cap out from its closely fitting inlet. It will also serve as a sturdy pressure point for your edging clamp as described later.

The next step is to make templates, as exact as possible, of the outline of each side of the butt cap (Fig. 5). This is not so easy to do, for it requires making a two-dimensional form from a three-dimensional rounded object (I had to try several times). Bob Phillips suggested that I cut the

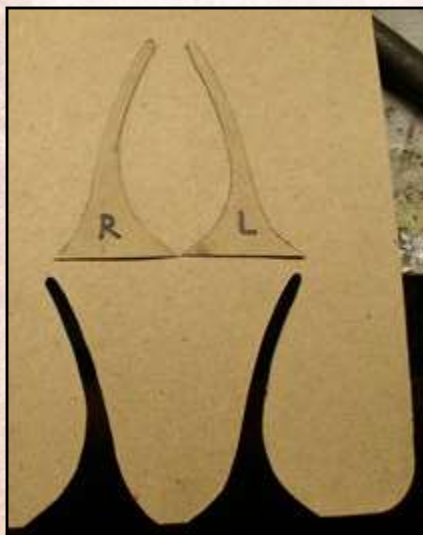


Fig. 5. These templates were cut from 0.015" thick shirt board. I would imagine that the Georgian Period pistol smiths used similar templates. Perhaps theirs were of sturdier material like sheet metal that wrapped over the entire included area of the butt cap for precise alignment of the tangs.

butt cap right down the middle to make it easier, but he didn't have to pay for the casting or getting it back together. It should be symmetrical, but if it is not, the annealed tangs can be tweaked a bit without danger of breaking. The most important requirement here is alignment of the end of the butt with the desired curvature of the tangs. Ideally, the tips of the tangs should end up at the midline of the lock panel terminus, but even on some of the most beautiful Georgian pistols, the tangs may end up pointing a bit high or low of the lock panel centerline. To get the desired template alignment, I had to change the angle of the butt flat to the wrist curvature (Fig. 6). I have an assortment of French curves (the flat, plastic kind) that helped me out on this one.

In talking to Gary Tucker about the butt cap installation, he mentioned that, although he had not done one, he had heard that spreading the tangs wide apart (only after annealing) would simplify the process by allowing the



Fig. 6. The centerline of this pistol butt was drawn using a dial caliper and a French curve. Note the thin triangular section that must be removed from the bottom to allow alignment of the template with the centerline of the butt.

fit of the cap to the end of the butt without interference from the tangs. I always listen to Gary—he never steers me wrong—so to get an even spread of the tangs, I pulled a piece of cast iron pipe from the scrap heap to use as a mandrel (Fig. 7). Since the casting was malleable, hand pressure was sufficient to get an even spread of the tangs (Fig. 8).



Fig. 7. You'll know if your brass is sufficiently annealed if you can easily spread the tangs by gentle hand pressure against a round surface.



Fig. 8. These tangs will not interfere with the initial inletting of the lower part of the cap. Note the little hold-down tabs protruding from the ends of the tangs. Those are not just excess casting flash. They will secure the tangs in place in the final inlet. Make sure they are smooth and sharp.

Now all the easy stuff was done. Getting the cup of the cap up tightly against the flat of the butt was a chore and a half. A variety of tools that you probably already have can serve you in this task (Fig. 9). Whatever you do, don't



Fig. 9. These tools (from left) are a deep mortise chisel, a homemade paring chisel, a chisel made from a 1/8" diameter lathe cutter blank in a commercial handle (see suppliers), Dad's pocket knife with a re-ground blade and a 3/32" offset chisel.

inlet very far up the tang when fitting the cup of the cap because you may be burning your bridges behind you if the alignment is not perfect. Coat the rim of the cap with inletting black then relieve the butt flat a bit, press the cap up toward it, remove and see where the contact areas are (Fig. 10). Standing at the bench for long periods is hard on my bum knee, so I worked for 15-20 minutes and took a rest. This is the part of the process that requires a lot of patience, but you *must* get the cup well aligned. If you don't, the ends of the tang are sure to wander. Refer back to Fig. 3.



Fig. 10. Read your inletting black to tell you where to remove wood. This is a slow repetitive process. Patient persistence is the key to success.

One of the most frustrating parts of this protocol is moving the cup of the cap into its calculated position while ensuring that the ends of the tang stay aligned on their curving path toward the lock panel. Since you have your center line drawn on the stock, you can bend the tang a bit forward or back to stay on track, but if you do much of that, you will work

harden the brass and spoil the graceful, increasing curvature as the tang approaches the center point of the lock panel. Even a little bit of discontinuity will be noticeable there. You have to depend on what your inletting black is telling you while keeping both of the tangs aligned with each other and traveling along the desired arc (Fig. 10a).



For over half a century, I have been using edging clamps to facilitate close fitting of rifle butt plates. One comes in just as handy for fitting pistol butt caps (Fig. 11). Not only does a three-pad clamp maintain constant pressure on the cap while allowing both hands free, but also is precisely adjustable as to the force applied. I have three of those clamps, but in this project, before I remembered how handy they could be for this project, I went to tapping the cap with a rawhide mallet and fractured the wood where it tapers out to a fragile edge (Fig. 12). Thank goodness for



Fig. 11. As the rim of the cap nears the butt flat, apply gentle pressure via a three-pad edging clamp.

TiteBond™ weatherproof wood glue. Anyway, if you don't have at least one of these versatile clamps, you are passing up one of the best tools for fitting butt caps on pistols or plates on rifles. They are available from any builder's supply company. Just ask for an edging clamp.



Fig. 12. This is what happens if you pound on the end of the cap rather than applying gentle pressure with the edging clamp.

Fitting a tapered part on two sides of the stock while changing the fit at the other end is analogous to holding a board with a long pole sticking out of it at right angles while trying to keep it pointed in exactly the same direction in a swirling wind. Every time your grip on the board changes to compensate for the push on the pole, that tiny movement of the board is amplified out at the end of the pole. Likewise, when some wood is removed from the butt flat, it changes the angle of the tangs. Since the tangs are curved, it is not just a matter of pushing the cap further into the inlet—the right amount of wood must be removed—otherwise the tang will bind in the inlet. So it is a balance between removing wood at the butt flat and removing tiny slivers of wood from the tang inlets while keeping the tangs parallel to each other side to side and on track toward their ultimate destination.

Well, that's enough whining. As the inletting proceeds, a little wood off here, a little wood off there, the curvature of the cap's cup comes into play. The first indication of cup rim curvature becomes apparent at the corners of the inlet (Fig. 13). When you start to see black at all four corners, you know that the cap is properly aligned with the butt flat. Removing this wood has to be done carefully because the rim of the cup is dipped at both front and back. The cap would be so much easier to inlet if the rim of the cup

10a. Here you can see that the tang is bearing on its inlet along its full length as it progresses up the stock. Just keep taking off those little black smudges to ease its passage.

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Fig. 13. The circumference of the cap has been penciled on the butt flat as a guide, but follow your black around the oval as you continue inleting.

were straight across front and back so that it could serve as a reference of alignment against the butt flat. As it is, you must let your black show you the way.

As the inleting of the tangs proceeds up the butt, their inlets become progressively narrower, so your tools must



Fig. 14. As the tang inlets grow progressively thinner, your tools must be smaller. Custom gouges and chisels can be ground from "1/8" thick drill rod or lathe cutter blanks.

be smaller than anything you will find in a hardware store or even tool companies online. A few years ago, Robert Mims made the tiny gouge and chisel for me (Fig. 14). The wooden handled gouge was included in a cheap set of 12 tools that has been in my shop for 40 years. Tiny gouges are easy to make from 1/8" diameter drill rod. Tiny flat chisels are easily ground from 1/8" lathe cutting blanks. Once you become confident in your own specialized tool-making, knowing that you will not have to want for a tool you can never find, a whole new level of independence opens up that builds confidence to respond to increasing levels of sophistication and precision.



Fig. 15. Pencil in a transverse "caution line" across the inlet's path to warn you where to stop cutting with a chisel and start rounding the inlet with a gouge of appropriate radius.

The tips of the tangs (Fig. 15). will probably be the most perilous for the first timer. Caution is the watchword here. Put a pencil line where the rounded tip of the tang will be inlet. However, you cannot push it forward into its inlet because the little tip-anchoring tab is sticking out beyond. So, you must undercut the inlet to admit the tab. Before you undercut the inlet there, firmly clamp the wood just beyond the end of the mortise. This will keep the surface wood in place while you drive a chisel in to make that undercut. Don't get into a hurry to finish and neglect this step. It would be a shame to do all that nice inleting only to inadvertently chisel up the very wood you are depending to hold the tip firmly in place.

Better yet, don't chisel at all. Chiseling creates a wedging effect that may weaken the overlying wood. I have a set of aircraft extended drill bits (18" shafts) graduated in 1/16" increments. The 1/16" bit allows a straight in hole to be drilled without upward pressure on the overlying wood (Fig. 16). You can hammer out a usable spade-type drill



Fig. 16. A 1/16" bit with a long shank can drill a relief for the spiked hold-down tabs at the ends of the tangs.



Fig. 17. This tang is now secured by the spiked hold-down tab. There is a lot of blackened dirty wood standing proud of the tang surface that must be removed.

from a piece of drill rod or even welding rod. It may be used only a few times, and will drill only wood or other soft materials, but there is no substitute for it when it is needed. Whatever method you use, be gentle when drilling the mortise for the hold-down tab or applying pressure on the cap to seat the tab.

Use something gentle like a tapered section of chopstick to tap the tang down to the bottom of its mortise (Fig. 17). Remember that the tangs are annealed and relatively soft. Do not use a steel punch or even a brass or aluminum punch because you will risk battering and spreading the tangs in their inlets. Now, using your edging clamp

bearing against, slowly advance the tang that last little bit to seat the tip-anchoring hold-down tab and take up the space at the end of the tang inlet.

If you have done a close and careful job of inleting, you

may find that you have become a victim of your own success because it is very difficult to remove the cap from its inlet. You might be able pull it out with pliers clamped on the boss protruding from the cup. If that fails, drill a 9/64" hole in the protrusion and thread for a #8-32 machine screw that has a die run up to the head to form an improvised handle (Fig. 18).



Fig. 18. Sometime as the butt approaches final fit all around, your inletting is so good that you can't get the butt cap out. This improvised handle might just do the trick. It that won't budge it, run the machine screw down against the wood and carefully back the cap out.

After the inletting is complete and the cap has been thoroughly seated, saw off the protrusion and file it flush. The hole in the cup is clearance drilled for a #6 oval head wood screw. Countersink the wood screw a little at a time so that the slot is aligned with the axis of the bore when it bottoms out against the cap.

Using the method described here I built enough courage to start inletting the butt cap into the real pistol. I knew that it was going to be another tedious job—and it was—but with the knowledge gained from practice, it went right along. I suppose that after

doing a few of these, the 17th Century French and English craftsmen looked on it merely as another day at the office. I'm not sure I could bring myself to that mental state.

The final structural chore on the real pistol (which I didn't do on the practice piece) was the shaping of the butt back to the level of the brass. I stuck the pistol together with a minimum of screws to give a preview of what the finished

pistol will look like. There was still a lot of inletting black-smudged wood to be removed, but the fit looked



Fig. 19. Right strap looks good.



Fig. 20. Left strap looks good.

good all the way up the straps. (Fig. 19, 20). Surprisingly, the most problem-prone area on the real pistol was the back of the butt where the wood flared out to meet the thin edge of the curve of the cup (Fig. 21). In retrospect,

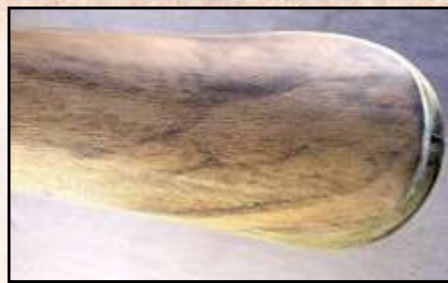


Fig. 21. Inletting black smudges still need to be sanded off, being very careful not to ruin the fit of the thin rim of the cup to the wood.



Fig. 21a. Job well done.

most of that problem was caused by the pistol blank being cut very slightly too close in that area. The butt area had a variety of fine cracks and checks which didn't help any during the inletting.

It is obvious that inletting this butt cap into a from-scratch blank is a lot of work fraught with some peril. As an alternative, consider a pre-shaped stock (see suppliers). The stock (Fig. 22, 23) has been inlet for the butt cap, barrel, lock and trigger.



Fig. 22. Commercially inlet pistol stock right side.



Fig. 23. Commercially inlet pistol stock left side.

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This was quite an adventure for me. With a butt cap in place with no gaps or major boo-boos on the real pistol, I am encouraged to carry on with the other major steps in the fit and finish of this pistol. I still have another butt cap casting, so perhaps a matched set would not be out of the question . . .

I hope that you have gathered sufficient information from my struggles to successfully install a Georgian Period butt cap. It has been well worth the effort in learning, for to my mind, it is the classic conformation for an elegant flintlock pistol. If I have gained nothing else, I now hold a great deal of respect for the 18th Century artisans who toiled day by day to earn their daily bread while creating a legacy of firearms artistry for us to follow.

Acknowledgments

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Suppliers

Brownell's Inc., www.brownells.com, 800-741-1500, for AcraGlas™ and a wide range of gunsmithing materials and tools.

Muzzleloader Builder's Supply, 877-397-3008, www.MuzzleloaderBuildersSupply.com, for a complete range of American-made parts for building rifles and pistols including a shaped stock that accepts the L&R Classic lock (bridled or unbridled), #BC-245 butt cap, #34190 trigger and range of smoothbore barrels from .50-.62 caliber.

Wood Carvers of Reddit, www.reddit.com/r/Woodcarving, https://www.reddit.com/r/Woodcarving/comments/2rt-hor/micro_chisels_and_gouges/ for info on making micro wood chisels and gouges MB

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