

# 1911 80% Project

## Introduction

This was my first attempt at building up a new 1911 from an 80% frame. I'd reworked others in the past and assembled a couple from kits but this marked the first time I'd ever attempted a build from all new, quality, unfitted parts. Below I have documented my journey into the world of custom 1911 builds.

## The Frame

The 80% complete frame was purchased from [Kristi Tool](#). It sat around for a few months while I worked on other projects, but one thing I have learned about doing 80% firearm projects is that you should buy the frames when they are available, because the supply can be erratic. I believe I paid \$150 for the frame. Ostensibly the frame needed only the slide rails cut, along with the barrel link relief cut. Everything else is supposed to drop in with minor fitting.





As you probably can see from the photos, the frame was machined in two halves, then brazed together in an industrial furnace. This is obviously a departure from the usual manufacturing methods, but I have been reassured of the strength of the weld. Also, the designer saw fit to include a finger grip and tactical rail extension on the dustcover. At this point I wasn't sure what I would do with these, but I decided to leave them for now.

## Cutting the Rails

The first and most critical machining operation is that of cutting the rails. Now, I had a set of good blueprints (in addition to Jerry Kuhnhausen's manuals), but in the end I decided to take the dimensions of the cut from my Sistema 1911 frame. The Essex slide I'd bought fit nicely on the Sistema, so I figured it would be a good idea to cut the new frame to match. I planned to cut the rails somewhat undersized to allow hand fitting and lapping for a tight fit.

To do the actual cut I chose to use a 1/16" thick slitting saw, and clamp the frame upright on my angle plate. Below are a couple of photos showing how I set up the frame for the initial cut. The tactical rail came in handy for a clamping spot; this area was much thicker than a standard 1911 dustcover. There are several ways to cut the rails, but I thought the slitting saw would be easiest to use and would minimize the chance for errors. With the saw being 1/16" thick I would have to make two passes to achieve the 3/32" width of the slot.



Here you can see me using the dial test indicator to make absolutely certain the frame is parallel with the spindle. A few taps with a light hammer lined it up nicely.



Before making the cut I painted the frame with layout fluid and used a dial indicator to position the slitting saw at the correct height to make the first cut. I checked the travel of the table first to be certain I would have enough room to cut the whole length of the rail. The mini-mill's travel was enough to do the job, but just barely. OK. Now to make the first cut.



I ran the slitting saw at about 700 RPM, used plenty of cutting fluid, and fed the table slowly. I advanced

the saw into the piece about .010 at a time, until I reached the dimension I'd set. The saw did a beautiful job. It didn't have the least problem making the cut. After the first pass, I lowered the quill the rest of the way and made the second cut. Then I flipped the frame over and cut the other side. Here is how it looked after the cuts were complete.



While the frame was clamped upright to the angle plate, I took the opportunity to cut the barrel link relief slot in the locking lug area. This is just a short groove that gives the barrel link room to swing down. I don't have any photos of this process, but it wasn't difficult. This is not a critical cut in any way, you just don't want the barrel link to touch metal. I used a 1/8" endmill and just eyeballed this cut, comparing it to the existing cut on my Sistema frame. I took a couple passes and that was finished.

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# Fitting the Slide

The slide would not quite fit onto the rails, so I used a fine-cut file to deepen the rails a bit until I could fit the slide onto the rails with the aid of a plastic-faced hammer. I used layout dye to detect where I still needed to file. I continued to file here and there until I could move the slide back and forth with some difficulty.

Here I began using slide lapping compound. I started out with 600 grit compound. This stuff looks like gray putty. I mixed a bit of cutting oil into it with a paintbrush and liberally coated the rail surfaces on the frame and slide with it.

At this point, it was nearly impossible to move the slide with your hands. I needed to make a lapping handle that would allow me to apply some leverage to the slide to get it moving. Brownell's makes one of these, but I wasn't crazy about spending \$40.00 for something I could build with my lathe in about 15 minutes. Theirs certainly would have been better made and more comfortable, but the one I came out with did the job. A photo of it is below. To make the "tab" that fits into the bushing slot, I simply turned a high "ring" at this point, and then removed the tool from the lathe. I removed the rest of the "ring" with a belt sander and file, leaving a fraction of it to form the "tab." Now this tool would fit into the bushing slot, and a hole drilled for a crossbar would help give me more leverage. I debated borrowing the ball handle from my Dillon reloading press for a handle, but in the end, quick and dirty won out.

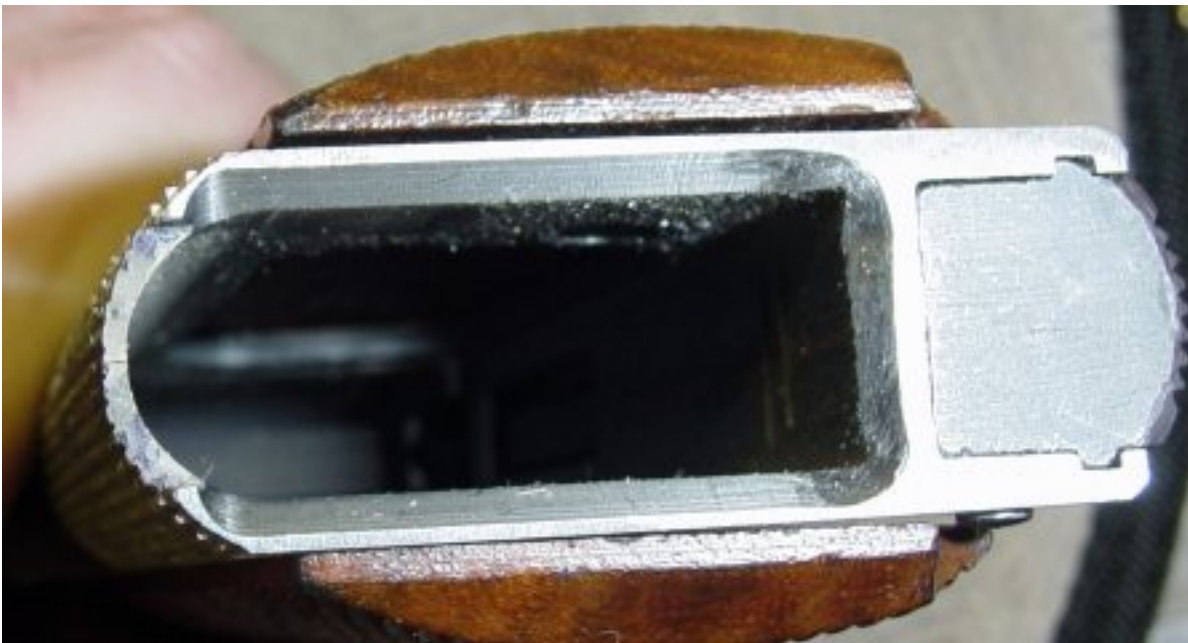




Lapping the slide is a lot harder than it sounds. It took me about three hours, including making the tool, spread over a couple of days before I got the slide to the point I could easily move it. In the last hour I went to 800 grit compound, and finally to 1000 grit for a finishing touch.

## Beveling the Magwell

After fitting the slide, I decided to try to use the mill to cut a bevel in the magwell. I don't have any photos of this process, but it wasn't difficult. I simply clamped the frame upside down in my vise, tilted the mill head about 35 degrees, and used a 3/16" end mill to cut the inside edges of the magwell. I swiveled the vise 90 degrees to cut the front and back of the magwell. I used the almighty eyeball for this operation, cutting until it "looked right." The photo below shows the final result.



## Removing the "Features"

It was about here that I decided I couldn't live with the "tactical rail" and the finger grip. The rail would

prevent the gun from holstering in my 1911 holsters, and it just looked goofy. The finger grip was well-placed, but it was rather sharp, it looked goofy, and besides I was planning on checkering the frontstrap. So these features had to go. Sorry I don't have any photos of the process. I just hogged most of the metal off with my mill, removed much of the rest with the belt sander, and used a file to rough out the shape of the original dust cover and front strap. In most of the subsequent photos you can still see the dust cover isn't completely filed to its final shape. Here's how it looks so far.



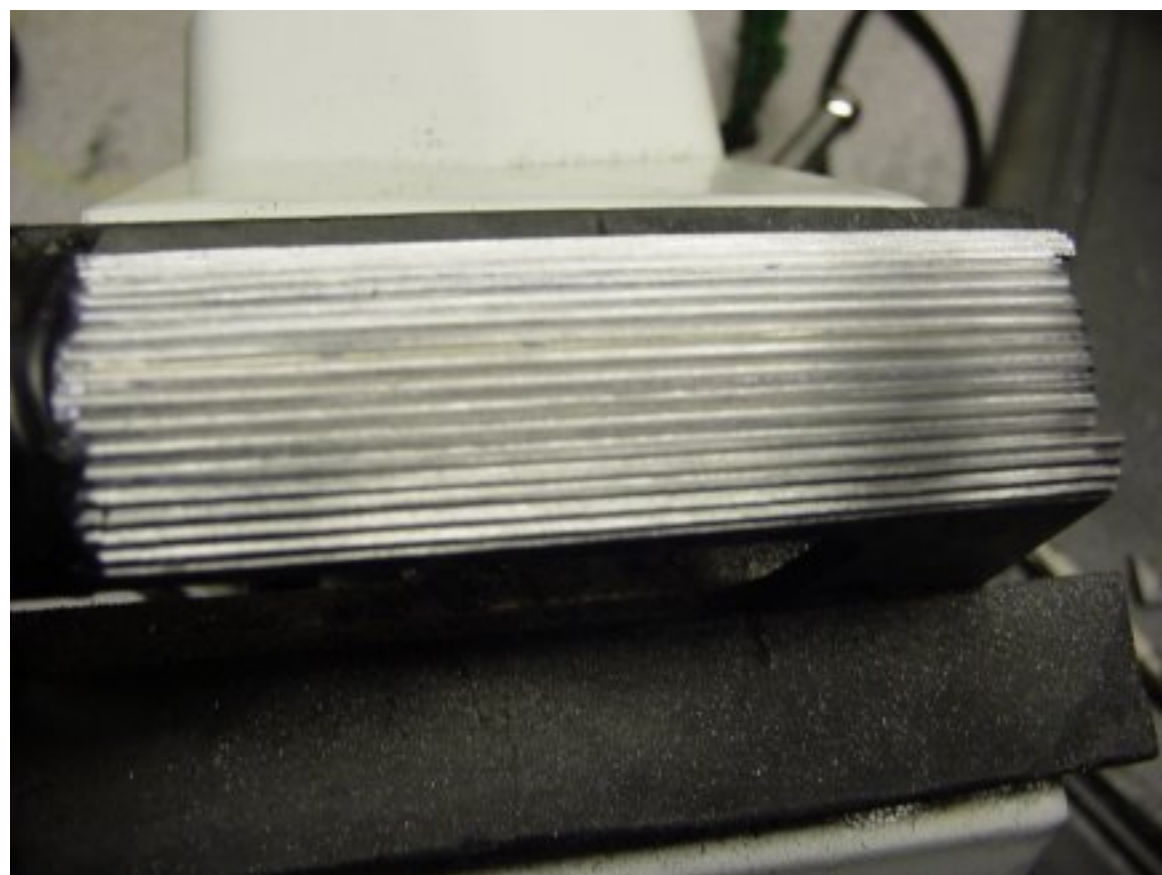
## Checkering the Frontstrap

I had bought a 20 line-per-inch checkering file from Brownell's several months back with the intent of cutting checkering on the frontstrap of my little Kahr K40. Frankly, I was too scared to attempt it on that gun. Too scared of screwing it up. Enter the KT 1911 frame. I thought I would try my hand at it on this gun. I reasoned that if I screwed it up badly enough, I could weld one of those pre-checkered frontstrap panels over the mess. With this Plan "B" backing me up, I jumped in with both feet. After carefully studying both PvtRyan's and Blindhogg's checkering pages, I was ready to proceed with Plan "A". One thing that both men had mentioned was the absolute necessity for a jig of some sort to help you lay out your lines straight. I used a piece of angle iron, clamped in my vise with some spacers, to provide this surface.



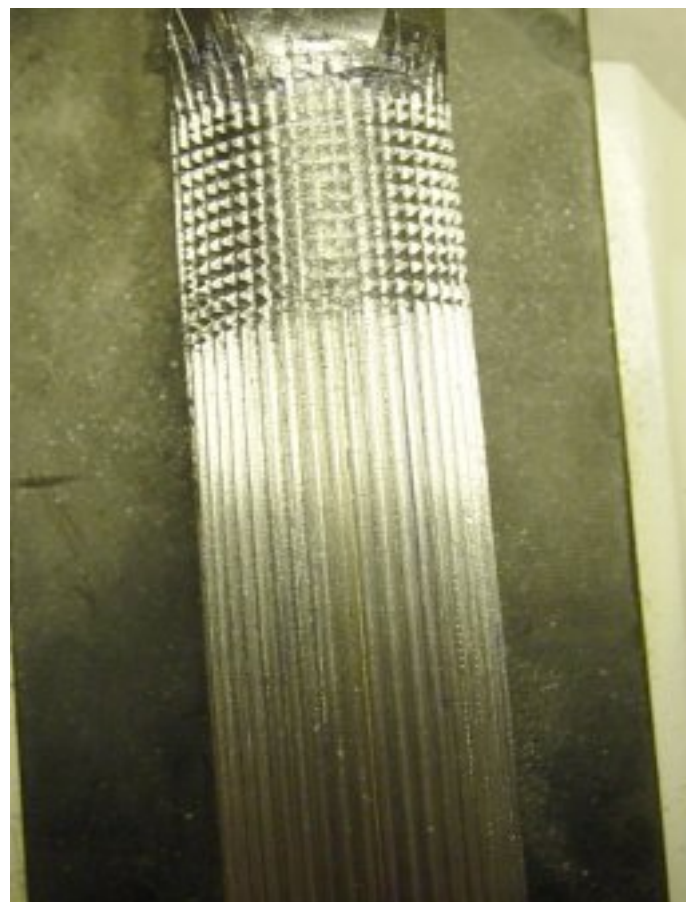


The edge of the angle iron gave me a straight solid surface to rest the edge of my file against as I began to lay out the "verticals." The way you lay out the verticals is, the file cuts a row of grooves with every pass. You take a few strokes to deepen these grooves, then move the file over a bit to use the existing grooves as a guide to cut new grooves. You only need to use the angle iron to cut one good straight set of grooves, then you use these as a basis for the rest of them. This was difficult and took a fair amount of concentration to keep the file from jumping out of the grooves, especially once I began to get near the edges of the frontstrap. Layout dye was used liberally during this process to help measure my progress. When you have the frontstrap covered with a set of parallel grooves, you use a triangular needle file to deepen them. This, by far, was the most time consuming part of the job. I estimate I spent about four or five hours just doing this. I found myself using the tip of the file as a scraper more often than not; this seemed to cut faster than laying the file in the groove and actually "filing." Before I began deepening these grooves, I'd used a round needle file to cut a shallow "trench" across the top of the frontstrap to provide a stopping point for the tops of the grooves. Despite this trench, I still found myself occasionally gouging the area past the top of the grooves. I soon put a few layers of electrical tape over this area to help stop that, as you can see below.



Finally I had brought the vertical grooves to their final depth and was ready to start laying out the horizontal grooves. A similar jig was needed here to make sure the file was cutting straight across the

frontstrap. I hunted around in my junk box and came up with an SKS sight pusher. This clamped perfectly across the frontstrap and provided a temporary straight surface to guide the file. Now, I was dreading cutting the horizontal grooves; as long as it'd taken to cut the verticals, I was sure I was looking at another 4 or 5 hours of filing. Fortunately, not so! I found that I could quickly cut the horizontals to full depth with only a half dozen or so strokes of the checkering file. Below you can see my first row of horizontals (and the ugly gouges up near the trigger guard.)



It only took me about an hour to cut all the horizontals, and deepen them fully. I did it all with the checkering file, too. I noticed that you must be careful, though, when moving the file over to a fresh row. It is very easy for the file to jump out of the grooves and cut where you don't want it to. I soon realized I needed to pull the file backwards a few times to create a light series of notches to help the file stay in place. In the first photo below I have finished cutting the checkering. In the second photo I have removed the gouges under the trigger guard with a needle file.



And that's it for checkering. I was pretty proud that I hadn't botched it by this point. I have to give the highest kudos to PvtRyan for his incredibly detailed, well written, and unbelievably informative

checkering pages! Blindhogg, also, saved me about \$100; he gave me the angle iron idea, and kept me from having to buy a checkering jig. Like most garage smiths, I really hate paying big bucks for a highly specialized tool that will only be used **maybe** once a year, at most. I try to find a way to get by on the cheap, especially on these occasional jobs. I suppose if you're Ed Brown, having the best jigs makes sense, but for me, I really can't justify it.

Anyway, on to the next job!

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# Fitting the Beavertail

A friend had given me an old stainless steel beavertail (I assume of Kimber or Wilson make), so I didn't have to buy one. Unfortunately I plan to blue this gun when it's finished, so a stainless part was a no-go. Luckily the stainless beavertail would fit nicely on my already-customized Sistema, so I simply stole its Ed Brown hi-rise beavertail for use on the new gun. It's painted a stainless steel color, but it is in fact blued underneath. So let's get started.

## Brownells Hates Me

Brownells' sells the Ed Brown beavertail cutting jig that is designed to help you quickly and accurately cut the excess metal off the grip safety tang, without danger of going too deep. This jig is nothing more than a pair of .500" diameter steel buttons that screw together through the grip safety hinge hole, so once again my inner Scotsman manifested. I had some water hardening .500" drill rod lying around, so I simply turned down a 1.5" length of it until most of it would fit the grip safety hole. I left a .5" button on the end of it, and threaded the narrow end. I cut another .5" diameter button, and drilled and tapped it to accept the other piece. The Brown jig is hardened to allow filing right up to it, so I used my propane torch to heat my jig up to bright orange, and quenched it in water. I didn't bother tempering it. Testing it with a file simply removed the black oxide coating that quenching had given it, it didn't cut any metal. Voila! Another 15 minutes on the lathe had saved me \$22.00, plus shipping. Don't get me wrong, I absolutely love Brownells', but I'd rather spend my money on parts instead of tools.





With the jig installed, I headed straight for the belt sander, which did a great job of removing most of the excess metal sticking out beyond the jig. I didn't want to get too close because a belt sander will cut even hardened steel. I switched to a file to take down the rest of it. I stopped when there was no more metal being cut, and the file was just skidding across the hardened jig.





Now the grip safety dropped right in, but there was a problem. It wasn't pivoting down nearly far enough. I had to do some fitting on the surfaces indicated below before the part would pivot all the way in. Funny, it had fit into my Sistema fine.



Now there was a new problem. The beavertail went too far in! Something wasn't quite right here. I grabbed my Sistema and compared the backstrap with the KT frame. The KT backstrap was about 1/8" higher than the Sistema, so the beavertail and mainspring housing seemed to be recessed too deep in their respective areas. Dammit! Now I was going to have to take at least 1/8" metal off the backstrap to get things fitted correctly. I could've done it with the mill, but in the end I decided using a file would be quicker. Well, a file, and the Dremel. Below I am removing the metal and blending in the beavertail.



The following photos show the backstrap before and after.





While I'm on the subject, I should mention that the Colt mainspring housing I was using would not fully go into place. It seemed to stop about 1/8" short of where it should have been. It seemed the mainspring housing slots in the frame were not cut quite long enough. Quick solution: file off 1/8" from the top of the mainspring housing rails. Problem solved, but I wonder how many other parts I'll have to modify before this thing is finished.

## Fitting the Trigger

The same friend who'd given me the beavertail grip safety had also given me a brand new Burns "hard use" trigger. By now you should not be surprised to learn that quite a bit of filing was required on this as well before it would fit correctly. I had to take about 1/16" of metal off the top of the trigger to get it installed. Then there was so much friction in the trigger stirrup slots in the frame that the trigger would bind, and not move freely back and forth. This was solved by taking metal off the outside of the trigger stirrup, and also using a diamond bit in the Dremel to deburr the inside of the frame, where the trigger stirrup rides. The problem was minor, and easily enough solved, but I admit I am getting a little frustrated struggling with this frame, and having to do extensive fitting to get every part installed. I suppose the consolation is that I should have a very tight gun by the time I'm finished.

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# Fitting the Fire Control Parts

Now that I've got most of the basic parts more or less fitting, let's see what happens when we try to get the fire control system going. The disconnecter and sear are made by either Brown or Wilson (I forget which), so they should be pretty fair quality. I'm using an old Sistema hammer as a stand-in, since I haven't decided on a "final" hammer.

Well, the first thing I notice is that the hammer and sear pin holes are too tight. No surprise there. A couple minutes with a round needle file gets them opened up enough to allow me to tap the pins in with a light hammer. If necessary, I will take a reamer to them later.

After the sear, hammer, disconnecter, sear spring, and grip safety are installed, I notice the hammer won't drop when the slide is in battery. Hmm. Kuhnhausen says the disconnecter may be too long. Sure enough, the dial caliper says it's 1.310". He also says that most fitted Colt disconnectors are 1.287-1.290". A few file strokes on the top, and back in it goes. This seems to do the trick. It mikes at about 1.295". Kuhnhausen says this is OK, though it might drag. I'm just happy the hammer falls when I pull the trigger. With no thumb safety, I use my beavertail jig to hold the grip safety in place. It seems to work: its leg keeps the trigger stirrup from moving back. And the trigger doesn't bind anymore. Good so far. I'll come back and polish it later. The trigger pull is not horrendous, maybe 6 or 7 pounds, but it could use some cleaning up. I'll go back and take care of that when I am doing my "fluff n' buff". My goal now is simply to get the gun running safely and dependably.

## The Thumb Safety

With the disconnecter, sear, and hammer installed, I test-fitted the thumb safety (a spare McCormick I had sitting around). I used layout blue on the edges, and I gently tapped it down with a light hammer. This showed me where I needed to remove metal, so I grabbed the half-round needle file and went to work. I repeated this process about 6 times until there was no more dye being rubbed off. When it finally inserted, I noticed some slight binding when I tried to pivot it up. Turns out it was rubbing on the head of the hammer pin. I hit that with a file and no more rubbing. A function test of the safety verified it was working correctly.

## Slide Problems

Seems the slide won't go fully into battery unless you really let it fly home. There is something that is preventing free movement, and I suspect something with the barrel/slide/frame fit. Time to coat the barrel with layout dye to see what the culprit is. This is a new Springfield Armory barrel and it is pretty tight. Racking the slide several times should show where metal is hitting metal. After doing this, I didn't really notice any dye rubbing off onto the frame, or any unexpected marks on the barrel. However, the full length guide rod is getting pretty scratched up. I think the barrel bushing isn't properly relieved enough to allow the recoil spring plug to move freely. This is resulting in the bushing pressing the plug against the

rod, causing the friction I'm feeling. I test this hunch by yanking out the guide rod and replacing it with a GI recoil spring guide and plug. No more problem. This is easily fixed. I take my Dremel and a diamond bit to take a little metal off the semi-circular notch at the front of the barrel bushing, and follow it up with a Cratex bit to polish it up. That seems to have done the trick.

## The Hammer -- Oops, I Mean, The Sights

I have reached a point where I can't test all the parts together because the Sistema hammer won't work with my extended beavertail. I wanted a Commander-style hammer but for some reason they aren't too easy to find. I finally found one at Caspian Arms, and Gary shot it out to me very quickly. The small-ring hammer should have plenty of clearance with the beavertail I'm using.

While I'm waiting for the hammer to show up, I'll see if I can get my rear sight installed. I opted for the simple target-style replacement blade and tenon from King's. My first thought was to buy the Wilson Combat Pyramids, but that would have also required a \$25.00 dovetail cutter for the front sight. So I decided to go with the \$16 King's. Sights are easily replaced later, and, besides, I am not really planning on carrying this gun for self-defense. The specs on my Essex slide say it has a narrow tenon, so that's what I order.



I noticed the rear dovetail is too narrow for the rear sight to even begin to slide in. I curse myself for not ordering a dovetail file, until I remember that I have a triangular needle file that will probably work nicely instead. Sure enough, it does. After about 10 minutes of dye, cut, try, and dye again, I manage to get the rear sight in with some gentle taps with my hammer. It will have to be removed when I finish the slide, but at least there won't be any more fitting necessary after it's blued. The corners of the rear sight are a bit sharp, and I make a note to round them off somewhat. The front blade is a sharp 90 degree angle, and I would like to bevel it to reduce snagging, and checker it to reduce glare. We'll see about that later.

## The Hammer

The Caspian hammer showed up the next day. Here is a photo of it.



There shouldn't be much to do other than install the hammer strut, and put it all together to see how it fits. You can see the plunger tube is still not installed, because I haven't finished polishing the frame yet. Also, in this photo I have finished filing down the dust cover to size.





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# Polishing the Frame

At first I wanted to do a finish similar to my [Combat Commander](#), but the more I thought about it I gravitated towards a brushed finished on the flats, with a matte finish on the rest of the gun. Besides, a very high polish is a lot of work. I figured 400 grit would be about right for this gun. The Combat Commander has a 1000 grit finish.

The KT frame was milled out of billet steel, so its surface is free of serious imperfections. Only some light toolmarks remain. To remove these, I began by taping a sheet of 240 grit wet-or-dry sandpaper to a piece of plexiglas, and using a light oil for a lubricant. After about 10 minutes I realized I wasn't making much progress. I grabbed a fine-cut file and went to work draw filing the flats. This worked much better. The file easily removed the toolmarks without introducing deep scratches... it helped that I cleaned the file every few minutes. Placing the frame back on my sandpaper sheet, I noticed things were going much better now.



After the file marks had been polished out, I exchanged the sheet of 240 grit for a sheet of 320 and polished another 10 minutes or so. I grabbed the plunger tube and polished it as well, since it came in a matte blue finish.

The KT frame has some excess material at the rear of the frame. When the slide's in battery, there is about 3/32" of frame sticking out of the back. A Dremel grinding stone made quick work of this material, and I polished it up with a dowel wrapped in sandpaper.

## Installing the Plunger Tube

The holes for the plunger tube legs should be relieved inside the frame to allow some room for staking the tube legs. I didn't have the special reverse countersink bit for my Dremel, but I did have a ball-end diamond burr. It did a pretty good job at recessing the holes a little. This plunger tube has some tiny holes drilled into its legs, too tiny for me. Since I will be flaring these openings in the legs outward, I wanted to be sure the metal would be thin enough to swage properly. I used a cone-shaped bit to widen the holes.

## Polishing the Slide

The Essex slide came in a matte blue finish that I will need to bring up to the level of polish on the frame. I'm going to use sandpaper wrapped around my square polishing stone, as a backing block. I don't want to use the "polish the slide against the table" trick because this may have the unwanted effect of polishing the slide serrations as well. This shouldn't take long because I am going to leave the curved surfaces of the slide alone, since they'll be sandblasted later.

## Polishing Various Parts

Before I put a final finish on the gun, there are several parts that need some attention. The thumb safety had a very coarse ground finish, and needed some reshaping to blend in nicely with the altered frame. A few minutes with a needle file and some sandpaper took care of this.

I want to polish the sides of the blued hammer to achieve the Colt look. I'll leave the sides in the white and polish the remaining surfaces to a higher gloss.

The serrated mainspring housing has seen some wear and tear, so I needed to do something with it. Luckily it is serrated at 20 lpi -- hey, a light bulb just turned on. I grabbed my checkering file and went to work. About 30 minutes later I had a checkered arched MS housing that matched my frontstrap. It didn't take long at all since the hard part (serrations) was already done.

## Dehorning

Another task to complete prior to finishing is to dehorn the frame for comfort. All 1911 'smiths talk about doing this (some call it a "carry bevel"), but nobody ever tells you exactly what they do. The idea is to round off the sharp edges on the gun that make it uncomfortable to handle. This also helps reduce wear on holsters and clothing. Some of the sharp edges on the new frame and slide are sharp enough to cut you. I take a needle file and do the following:

- radius the front edge of the dust cover
- break the edges on the inside & outside of trigger guard
- break the corners on the rear of the frame, above the beavertail

- slightly break the corners on the bevel around the mag release boss
- round off the corner of the frame where the mainspring housing pin goes
- round off the sharp surfaces around the front of the magwell
- file down the sharp diamonds around the magwell
- break the corners on the slide's muzzle area (I like to really round off this area) and barrel bushing
- bevel the ejection port edges, rear slide edges, front and rear sights (but don't touch the edges on the actual sighting surfaces, they should appear crisp)
- any offending edges on the external parts such as safeties, hammer, slide release, etc.

## Slicking up the Action

Once you have had the gun together and function tested it, this is the ideal time to polish mating surfaces to smooth out the action. These surfaces may never see the light of day, but they can make a world of difference when operating the action and controls. It isn't strictly necessary; most factory guns come out of the box fairly rough and will "wear in" somewhat after a certain amount of use. But the whole point to building a custom gun is to go the extra mile and take care of the myriad little details that result in a gun to be proud of. To do the job I use either a fine Cratex Dremel bit, or a bit of 600 grit paper for light polishing. Here is a list of the surfaces I polish.

- Pins: hammer, sear, thumb safety pin (very lightly, do not remove metal)
- Plunger tube detents (the ends)
- Mag release, including the spring channel, and corresponding frame surface
- Mag release spring retainer
- Mainspring housing spring channel
- Mainspring cap
- Outside of trigger stirrup, and corresponding frame cuts
- Sides of hammer (pivoting surface area), and corresponding frame surfaces (very lightly)
- Round edge of hammer (where sear drags when you cock the hammer - leave sear ledge alone for now)
- Top of disconnecter (slightly break any sharp edges)
- Thumb safety, where spring detent bears
- Thumb safety, inside (side facing frame)
- Recoil spring guide rod & inside of spring retainer
- Slide release, detent area, and remove any burrs, but do not break corners except on exterior "user" surfaces

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