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EDITION

PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

A TECHNICAL JOURNAL OF CRAFT, REPAIR & RESTORATION

07

ARCHIVE ISSUE NUMBER

INSIDE THE ARCHIVE

BROOMHANDLE MAUSER REPAIR

WINCHESTER 94 RESTORATION • DOUBLE TROUBLE: STEVENS MODEL 311 • STEYR MANNLICHER SSG • GUNSMITH BUSI...

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 235

DIGITAL ARCHIVE EDITION

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MAINTENANCE & REPAIR

The Editor's File

BY AMERICAN GUNSMITH EDITORS JULY 2023

ORIGINAL PP. 2

Real Avid is a leader in firearm tools and continually develops new options for gun building and repair. One of their top options is the Master Gun Vise, a multi-axis bench-mounted position-locking vise, a design specifically for gun work. The workpiece can be quickly repositioned in any direction and angle with a Torq-Lok pin for applying heavy force. Removable and reversible Gun-Fit jaw sleeves provide a specific gun shape and a leveling knob for scope mounting and similar tasks.

The Smart-Assist Accessory System is a four-piece unit that includes a docking station, five-inch magnifying glass, 180lumen work light, and a cell phone holder that works with Avid's workstations and vises for positioning tools in any place. Ever had a "three-hand job"? This provides attachments for as many extra hands that you need. Recently added is the Master-Fit Combo Pack for AR-type rifles.

The combo pack includes five specialized Crowfoot builder wrenches that fit the most common AR-15 assembly nut sizes and a heavy-duty 1/2" torque wrench. The titanium-coated stainless steel construction provides tight tolerances for solid nut-gripping strength and enhanced no-slip tool control. The Master-Fit Thin Castle Nut Wrench is a key component of the combo pack, as it's specifically designed to fit pistol buffer tubes.

This type of buffer tube is thicker in diameter, preventing the use of a pistol brace, stock and your standard Castle Nut Wrench. The Thin Castle Nut Wrench is perfect for those who want to switch from a pistol brace to an AR-15 pistol buffer tube without any difficulties installing the castle nut. The Smart-Fit Vise Block Sleeve allows work on large-frame ARs with a precise fit and zero wobble.

It is designed to slide over the existing Real Avid Smart-Fit AR-15 Vise Block and eliminates any wiggle or movement while working on larger "adult size" AR-10 firearms. The sleeve can be used with an inverted lower receiver to work on pistol grips or allow easy access to the underside of your AR. It is a must-have tool for securing an AR when swapping trigger groups, servicing the lower receiver, installing grips and buffer tubes, or easily cleaning the barrel bore.

For more information on Real Avid's line, visit RealAvid.com or call John M. Buol Jr. AmericanGunsmith.info

ORIGINAL SOURCE PAGE

2

HISTORY

Broomhandle Mauser Repair

A clean sweep! A how-to on repairing, restoring, and refinishing a Broomhandle Mauser.

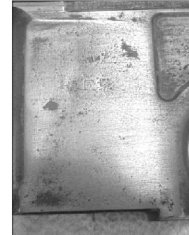
BY KEVIN BAXTER JULY 2023

ORIGINAL PP. 3-9



Right: The C96 Broomhandle in 30 Mauser as bought.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Left: Faint Chinese characters stamped into the right side of the magazine well at the factory read "Made in Germany".

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

The 1896 Mauser pistol has had more individual effect on history than most small arms. Winston Churchill carried one as a cavalry officer of the 21st Lancers with General Kitchener in Sudan and used it to good effect at the battle of Omdurman. He also had it with him in the second Boer War when he was a newspaper correspondent, proceeding to lose it when he left it on the train while trying to organize a defense against a Boer ambush.

He later assessed this as cloaked good fortune because had he still carried it, he might have killed the Boer officer who captured him (Louis Botha) who later was instrumental in integrating South Africa more fully into the British Empire. Gavrilo Princip precipitated WWI with one when he killed the Austrian Archduke Ferdinand and his wife in Sarajevo in 1914. Lawrence of Arabia armed himself with it (among other things). And of course, where would Han Solo be without his tricked out Broomhandle?

For nearly as long as I can remember (which is a substantial length of time these days) I've had a fascination with the Mauser C96 "Broomhandle". But for along

time, acquisition of one competed with food, diapers, and a car payment for my meager Navy paycheck, so I was reduced to reading about them.

Then in the early '90s, there was an influx of these pistols with Chinese markings, generally in indifferent condition but suddenly affordable as advertised in minuscule print in the back pages of Shotgun News, a sort of the grown-up Sears Christmas Catalog of the day. Moreover being relics, one could buy them through the mail—even in California. So while stationed in Monterey, I saved up about \$250 (including shipping) and ordered one in 30 Mauser without any deleterious effects on the diaper supply or pantry.

In due course the pistol arrived—it was about as tough as one might expect but functional, although the rifling was only a distant memory. Remarkably, the numbers matched and there were some of Chinese markings on the frame which, as I later learned, was as-issued in Oberndorf am Neckar, Germany. Translated, they read "Made in Germany". The markings and serial number infer that it's a 1930 model that was built for export.

It had evidently spent a great deal of time with the barrel wrapped in cloth; whereas the finish on the frame and back end of the receiver was OK with some pitting, the barrel was mostly bare and retained the mark of the cloth embedded in the steel. There was some deep pitting at the back end of the frame and on the backstrap and some lesser damage on the sides of the frame, but the innards were clean.

Over the course of the intervening years I shot it, it's not clear that the bullets ever actually touched the inside of the barrel on the way out except to sort of bounce off the sides and about the only way to hit the side of a barn with it was to shoot from inside. It eventually took to failing to go back into battery, requiring a manual cycle of the bolt (and then chasing down the unspent round ejected in the process), so I decided to overhaul the mechanics and refinish the pistol.

Thus, we have the fourth installment of my irregular reporting on the amateur resuscitation of elderly and/or unlikely firearms.

BROOMHANDLE MAUSER REPAIR CONTINUED

ORIGINAL PAGE 4



Far left: The pistol aligned to be taken down. The lock frame stop is at the top of the backstrap under the hammer. Left: The barrel/receiver and action sliding out the back of the frame.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Far left: The pistol aligned to be taken down. The lock frame stop is at the top of the backstrap under the hammer. Left: The barrel/receiver and action sliding out the back of the frame.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Below left: The barrel/receiver and action when removed from the frame. The action unsnaps from the barrel. Below right: The action removed from the barrel. The bolt locking block will come off and either the sear, the lock frame stop, or both will probably fall out.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Below left: The barrel/receiver and action when removed from the frame. The action unsnaps from the barrel. Below right: The action removed from the barrel. The bolt locking block will come off and either the sear, the lock frame stop, or both will probably fall out.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

Disassembly As with all projects involving a firearm, the first step is to carefully ensure that the pistol is unloaded, particularly as this pistol has a box magazine so its state is not visually obvious. Thus assured, takedown is simple. Release the magazine follower by pushing on the button at the back of the floor, forward of the trigger guard, then slide the floor forward a bit until the assembly drops out.

Cock the hammer, then depress the lock frame stop at the back of the receiver above the backstrap and pull back on the frame while holding the receiver. The receiver, bolt, and action will come out as an assembly. The action unsnaps from the barrel. The bolt locking block will come off and either the sear, the lock frame stop, or both will probably fall out. Set the frame aside and unsnap the action from the bolt, taking care to not lose the sear, safety, or lock frame stop in the process.

Set this assembly aside, then grasp the receiver and bolt assembly, peering closely at the back of the bolt. There you will observe the back end of the firing pin, thoughtfully slotted for a screwdriver. Using an appropriate size flat bit, engage the slot and push the

pin in while rotating 90° counter clockwise. This will allow the firing pin to be pulled out through the hole with the firing pin spring, leaving the recoil spring inside.

Observe on the right hand side of the receiver at the back a short knob (the bolt stop) mounted fore and aft. Push it forward to disengage from the side of the receiver and pull it out; it will be under a little tension from the recoil spring. With this disengaged, the bolt will pull out the back of the receiver with the recoil spring inside. Normal takedown is complete. Far The lock frame stop is at the top of the backstrap under the hammer.

Thus far we've pretty much accomplished the necessary postshooting steps preparatory to cleaning. The next step gets a bit more complex. The innards of the Broomhandle compare favorably with a Swiss watch in terms of spring loaded parts and complexity. Late Victorian Germans being what they were, there are no lightly wound springs and each is seemingly designed to launch its associated parts into orbit, or at least into the most inaccessible corners of the shop if not treated very respectfully.

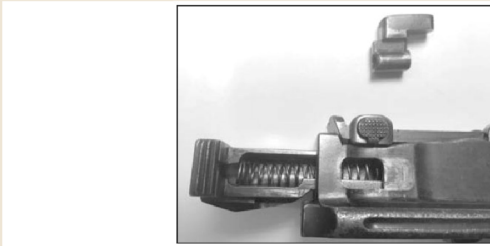
They were clearly designed by the same guys who set the torque value on K98 barrels. To disassemble the lock mechanism frame is straightforward but takes care. Some parts just fall out—the sear, frame lock and bolt locking block all come right off of their own accord. The safety pulls out from the left side by rotating it a bit with the hammer cocked, and the sear bar will rotate up and forward if the hammer is pulled back then eased down when the sear bar is clear.

Rotate the bar vertical and it will then come off its pin at the forward end on the right side. The easy part is done. The rocker plunger, mainspring, and mainspring plunger remain under compression between the hammer and the rocker coupling. This part is tricky. The rocker coupling needs to come out first as it pivots on two integral pins that set into corresponding notches in the bottom of the lock mechanism frame beneath the slot for the rocker plunger and it's held in place by the rocker plunger.

The rocker is essentially comma shaped, with the tail hooked to the front and the back (convex

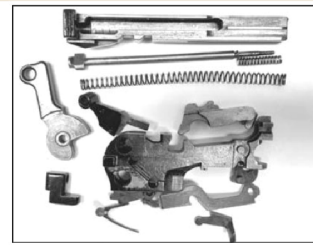
BROOMHANDLE MAUSER REPAIR CONTINUED

ORIGINAL PAGE 5



Above left: The bolt stop removed after taking out the firing pin. The bolt will now slide out the back of the receiver. Above right: All of the mysterious inner workings. Note, the rocker coupling is upside down for better clarity of the part.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Above left: The bolt stop removed after taking out the firing pin. The bolt will now slide out the back of the receiver. Above right: All of the mysterious inner workings. Note, the rocker coupling is upside down for better clarity of the part.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Far left: The trigger and magazine plunger with their shared spring. The hole in the spring makes it simple to grab with a dental pick both for removal and reassembly. Left: The cause of my worries was the hole in the sear bar that accommodates the pivot of the sear is worn particularly at the forward point, letting the sear drop too far down so it wouldn't engage when the bolt returned to battery. The new one fits with no slop but moves freely.

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ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

The bolt will now slide out the back of the receiver. side) up, fitting through a slot in the rocker plunger at the front of the mainspring. To drop it out of its slot, one has to compress the mainspring assembly while holding the frame vertically. The frame is full of sharp edges and corners that make it uncomfortable to hold, and the mainspring is robust.

After some trial and error and not a little healing, I found that a 10-32 cap screw clamped in a vise made a pretty good pin with which to compress the mainspring. The hex hole in the cap screw engages the front of the rocker plunger enough to keep it from sliding off (with some care), and the head is a little smaller than the plunger so it allows compression into the frame, which frees the rocker coupling to fall out into a presciently placed receptacle.

Once this is complete and the rocker coupling is retrieved, the mainspring assembly will come out the front of the frame. The combination sear spring and hammer pivot then pulls out from the left, whereupon the

hammer will drop free. The only disassembly on the receiver is the sight, and the trigger and floorplate plunger with their common spring.

The highly optimistic 1000 meter sight hinges on pins set into the integral sight base at the front, and is held down by a leaf spring that is inserted at the forward end of the sight. The small V-notch sight is at the back, and the sight is elevated by pushing in on a spring loaded sight leaf on the right side, which in turn engages teeth in the left side of the sight at whatever elevation is desired.

The foundation is integral to the back end of the receiver; the holes for the pivot pins in the front of the sight are in vertical ears on either side of the foundation, which have horizontal slots in them at the base. To remove the sight, push the front end of the sight down with a thumb against the leaf spring then pull back and the sight and slide mechanism will come right out via those slots.

Pull out the leaf spring and pull the slide off the front end of the sight, taking care to keep a thumb on the sight leaf and the spring loaded push button that allows moving the slide. Once clear of the sight, it will pull out to the right and release a tiny but mighty coil spring from an indent in the slide. Note, this wants watching carefully. Finally, in preparation for refinishing, we want to remove the trigger and the magazine plunger and spring. This is uncharacteristically simple.

They share a leaf spring with a lip on the front for the magazine plunger and ears on the side to hold it in place between the trigger and magazine well. The ancient Germans thoughtfully put a hole in the middle, which allows you to reach down the inside of the frame with a dental pick or Far The hole in the spring makes it simple to grab with a dental pick both for removal and reassembly. The new one fits with no slop but moves freely.

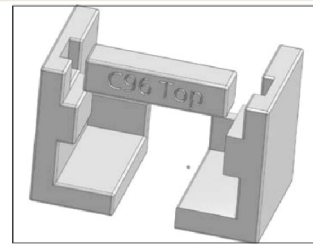
BROOMHANDLE MAUSER REPAIR CONTINUED

ORIGINAL PAGE 6



Above left: A CAD drawing from OnShape of my receiver protection for chucking the receiver/barrel in a 4 jaw chuck. Above right: Safely chucked up and dialed in, the barrel polished up nicely.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



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ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Far left: Deep pitting is evident on the right side back of the frame. There was more like it on the other side along with some dings on both sides forward of this. Left: The same spot post repair. The fix is indistinguishable with the finish over it.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



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ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

something similar and hook the spring, lifting up toward the front and pulling back. This will disengage the lip from the top of the magazine plunger and relieve the tension on the trigger at the same time. You can now fish the spring out. The trigger and magazine plunger will drop out when you turn the frame over. Repair and Refinishing My first thought regarding the pistol's failure to return to battery was either the sear or the bolt locking block.

As soon as I looked at the sear and sear bar, however, it seemed clear that the problem was right there. Although the parts are hardened, they've also seen considerable use, as witnessed by the shot out barrel. Over time the round pivot on the head of the sear, and the corresponding hole with an open bottom in the sear bar in which it rides, had worn to the point that the sear almost wouldn't stay engaged in the sear bar. It certainly sat too low.

Some research confirmed that this was a not uncommon failure mode for these pistols. Interestingly, the edge of the sear where it's

engaged by the trigger, and the edge of the back of the sear bar where it engages the hammer were both in pretty good shape. They were clearly well polished, but both were sharp and square. I found a new manufacture sear bar at KB International (KBtactical-Star.com) but I couldn't identify a reasonable source for a new manufacture sear, so I took a chance on eBay.

As it turned out, my original sear was probably okay as the worst of the wear was in the sear bar. Nonetheless, the new (used) sear was a better fit, so I went with it. I also bought a new recoil spring and firing pin spring from Precision Gunsprings (GunSprings.com) in Pennsylvania, with the most robust spring constant available. Upon reassembly with the new springs, sear, and sear bar, the action functioned fine manually and now awaited some range time to confirm the fix.

I wanted to put a smooth finish on the barrel, which required dressing it with emery and oil. The best way to do this is to chuck the whole assembly in the lathe and spin it, but

there is no convenient or even safe (to the metal) way to grab the back of the receiver in a 4 jaw chuck. Which is where some 21st century technology comes in.

Considering the problem of chucking up the more or less square-ish but somewhat irregular back end of the receiver, I thought of and instantly rejected the usual expedients of brass shims. However, the thought of a jig that would both securely hold and protect the piece seemed like a good idea. I thought of machining one out of a block of plastic on the milling machine, but that rapidly fell into the too-hard basket. Then technology came to the rescue.

My brother John (also an occasional contributor to these pages) owns a Dremel 3D printer. Following some careful measurements, photographs, and production of an- Far There was more like it on the other side along with some dings on both sides forward of this. The fix is indistinguishable with the finish over it.

BROOMHANDLE MAUSER REPAIR CONTINUED

ORIGINAL PAGE 7



Left: All of the parts needing to be finished laid out in preparation. Only the back of the bolt needs finished and just the spur on the hammer.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Below left: The left side of the finished product. Remarkably, the Chinese characters on the left side of the magazine well that were very faint originally were actually enhanced by the application of Lauer's Dura-Coat. Below right: The right side of the finished product. The finish, prepared with careful sanding and J-B Weld, is nicer than the original.

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ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

notated drawings, we conspired on the phone and he quickly drew up a CAD model in On Shape, an online CAD program that is free to use so long as the files produced on it are left publicly available on its website (OnShape.com/products/free). We collaborated on that for a bit, then he produced a prototype of the left, right, and top pieces, which accommodated the contours of the back of the barrel assembly as well as the foundation for the sight.

We got it right on the first try so I chucked it up and the barrel polished up nicely. Having gotten to this point, I decided to see about a barrel liner. A quick search settled me on Redman's Rifling and Reboring (RedmansRifling.com). I duly shipped off the barrel to their shop in Omak, Washington and some weeks later Remarkably, the Chinese characters on the left side of the magazine well that were very faint originally were actually enhanced by the application of Lauer's Dura-Coat.

The finish, prepared with careful sanding and J-B Weld, is nicer than the original. Only the back of the bolt needs finished and just the spur on the hammer. It came back exactly as advertised—nice new bore, anew chamber set up with minimum headspace, and literally no seam at the muzzle. Now it was time for the

refinishing. The first step was to fix the deep but structurally meaningless pitting in the frame.

I learned that the pitting at the back of the frame and particularly on the frame for the grips is a common malady due to water intrusion through the holes in the slot for the stock attachment. The pitting was too deep and the individual pits too large to try to grind down, so filling seemed to be a reasonable approach. There are several products on the market for this sort of repair, but it struck me that a good, hard, and largely chemically-imperious epoxy would do the trick.

It should flow well and thus completely fill the pit, and when hardened allow for thorough sanding to conform to the frame without leaving scars from the sanding and polishing media. Remarkably enough, this pretty much defined my usual goto: J-B Weld. There is a version that is specifically designed to be machined when hardened and this seemed to be the best choice. I prepared the pits by cleaning them with turpentine and a stiff brush, then sprayed them liberally with Lauer's Dura Coat cleaner.

I then used compressed air to make sure nothing was left and the metal was dry. I mixed a batch of J-B Weld Steel Reinforced epoxy and applied it with a shaved down

Popsicle stick, using a wood toothpick to make sure all of the little nooks and crannies were filled. Each pit got enough epoxy to create a bit of a meniscus and spread over the edge a bit to ensure a thorough fill.

Once I had one side done, I put the job aside to set overnight (the literature claims 4-6 hours), then repeated the process for the other side the next day. With the epoxy fully hardened, I started sanding the excess down to conform to the structure of the frame. I didn't want to scratch the frame in the process, so I started with 200 grit and a gentle pressure using a bit of flat wood as a backing to ensure an even job. I graduated to 400 grit wet sandpaper, then a fiberglass polish.

The whole process took a couple of days (I find it pays to stop before I get sloppy) but when I was done the surface of the frame was tactilely flawless, with the repaired bits being indistinguishable by feel from the rest of the frame. The wood grips were well worn but otherwise sound, still sporting the canonical 12 horizontal lines. I stripped them carefully with Formby's Refinishing Fluid, preserving the original stain, then applied several coats of Birchwood Casey Tru-Oil Stock Finish.

THERE ARE A COUPLE OF SMALL

BROOMHANDLE MAUSER REPAIR CONTINUED

ORIGINAL PAGE 8



Left: Baxter shooting his restored Broomhandle.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

gouges in the front edge of both that correspond to pits in the grip frame, but I left those be, figuring they add character. Because I filled the pits with epoxy, it was clear that bluing was not an option, although that would have been my preference. I decided to finish the pistol with Lauer's Dura Coat in glossy blue-black, using the handy aerosol can. The aerosol Dura Coat is simple to use and gives you about two weeks of working time, so you can easily use it for more than one project with a little planning.

It does need to be used in a well ventilated space, but my father's HO model railroad-painting booth with It's a sweet shooter. a robust outside exhaust was the perfect place to apply the Dura Coat. Maybe a bit over a cubic foot in volume, it has a lazy susan on the bottom and a rotating rack on the ceiling from which parts can be hung. Even so, I had to apply the finish in two batches.

There are two big parts (the frame and the barrel) and nine smaller ones; the hammer, magazine floor, bolt stop, bolt (just the back), safety, lock frame stop, rear sight, rear sight slide, and its associated locking plunger. Even so, allowing for 10 minutes or so between coats I was still done in an afternoon. I was concerned that the Dura Coat would obliterate the Chinese characters on the left side of the magazine well as they were applied lightly, probably to avoid dinging the magazine well.

As it turned out, the Dura Coat actually enhanced them and they're easier to see now than they were when unfinished. Five coats on the small pieces and seven on the big ones later, the refinishing was complete. As in so many things, patience here is a virtue. I let the parts set for a couple of days to ensure a good hard finish, then reassembled the pistol. Now we're back to the fussy part. Reassembly for the most part is straightforward.

But you have to put the lock mechanism back together in the right sequence, remembering always the enthusiastic spring constants involved. So, in order, begin by inserting the hammer and then insert the sear spring/hammer pivot from the left through the hammer. Insert the safety from the left side. Insert the main spring assembly from the front—it will self align with the key on the rocker plunger at the bottom.

Holding the assembly upside down, with my 10-32 cap screw or something like it compress the main spring against the hammer, holding the rocker over its slot in the front with the tip pointed forward and the convex side toward the lock mechanism frame. Maneuver the rocker into its slot, ensuring that the tip goes all the way through the slot in the rocker plunger. Ease the tension back off of the mainspring and the rocker should be fully seated in its slot.

Laying the lock mechanism frame on its left side, place the round end of the sear bar over the corresponding pin at the front of



Below: First round out the barrel resulted in a hole in the X ring. It's a sweet shooter.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

the lock mechanism frame on the right side, with the sear bar at right angles to the top of the lock mechanism frame. Rotate the sear bar counterclockwise to engage the hammer, which will need to be pulled back a bit for it to seat. Insert the sear in the open bottom hole in the sear bar about midway back and ensure that the detent on the sear engages the sear spring.

Insert the lock frame stop at the back from the left side. The right side of it will engage the bottom fork of the sear spring. Place the rocker coupling on the top of the lock mechanism frame with the hook on the bottom front engaging the rocker. Test the operation by pushing down on the rocker coupling—it should snap down but then return back up when the pressure is released. Insert the bolt into the slide with the open side facing right facing forward.

Pushing the recoil spring forward with a convenient tool, insert the bolt stop in the slot on the right side with the main body toward the back. Release the recoil spring. Insert the firing pin with its spring (which threads onto the firing pin so you don't easily lose it). Using an appropriately sized flat blade screwdriver, push the firing pin in and rotate it 90 degrees clockwise.

Snap the barrel/receiver/bolt assembly onto the top of the lock mechanism frame—the rocker coupling will snap down and the whole assembly will then stick together. Don't forget about the trigger and the magazine plunger.

ARCHIVE IMAGE WITHHELD

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10 Recoil Spring 11 Bolt Breechblock 12 Extractor-Late Style 12a Extractor-Earlier Style 13 Magazine Plunger 14 Trigger Spring 15 Trigger 16 Rocker Plunger 17 Mainspring 1 Barrel & Extension 2 Rear Sight 3 Rear Sight flat spring 4 Rear Sight slide 5 Rear Sight Coil spring 6 Rear Sight leaf 7 Bolt Stop 8 Firing Pin Spring 9 Firing Pin w/Spring Drop the trigger into its slot and the magazine plunger into its hole aligned as shown in the accompanying diagram.

Take your dental pick, hook it into the hole in the middle of the spring and line the spring up with the lip forward and pointed down between the trigger and the magazine plunger. A little pressure on the spring will compress it sufficiently that it can be slid forward with the pick – it will snap into the detent in the magazine plunger, and you're done.

Taking care to not lose the lock frame stop out the left side or the sear off the right, slide the assembly Mauser C96 (Specifications subject to change without notice) 27 Rocker Coupling 28 Lanyard Ring 29 Grips 30 Grip Screw 31 Mag/Follower Spring 32 Follower 33 Magazine Floorplate 34 Receiver-main frame 18 Mainspring Plunger 19 Lock Mechanism frame 20 Bolt Locking block 21 Sear Arm 22 Sear 23 Sear

Spring 24 Hammer 25 Lock Frame Stop 26 Safety onto the frame from the back of the receiver, onto the front of the frame.

Push the assembly forward until it locks in place. It may take a little fiddling to get the ears on the back of the lock mechanism frame to align with the slots in the frame. Insert the magazine follower and spring into the magazine well. Slide the base onto the frame from the front until the spring loaded magazine plunger snaps into place. In practice, this takes about as long to accomplish as it does to read about it, saving perhaps getting the mainspring and rocker coupling sorted.

Once complete, you can check the function by cycling the bolt and it will lock back on an empty magazine. But one cycle will confirm that everything is working and that the hammer will fall when asked. Testing Once I had the pistol reassembled and was satisfied that the action was behaving, I grabbed the 18 rounds that I had remaining and headed to the Fairfax Rod and Gun Club for an operational test. I put six rounds each into three stripper clips, then loaded the first set flawlessly.

Just like with a rifle, the clip holds the bolt back avoiding the risk of a "Broomhandle thumb". Taking careful aim at the 15 yard

target, I squeezed the trigger and discovered that the safety works just fine—the hammer drops but doesn't get as far as the firing pin. After moving the safety from Sto F, I cocked the hammer and repeated the process, and I was awarded by a bang, recoil, return to battery, and a hole in the "X".

I was tempted at this point to unload the remaining rounds, clean the pistol and never fire it again, but I resisted. Instead I ran a dozen rounds through it and my efforts were rewarded by perfect functioning and a reasonably tight group, all things considered, in the black. I'm delighted with the outcome of this project. My somewhat questionable Broomhandle now works like new. Not only does it function as designed, it shoots reasonably straight, something not usually associated with it in either 9mm or 30 Mauser.

And while I would have preferred renewing the bluing, the repairs required to mitigate the pitting in the frame were beyond my abilities to fix in away that would make bluing feasible. Nonetheless, I think the Dura Coat finish is a practical and not displeasing solution. Thus closes another entry in my irregular journal of amateur reanimation of moribund firearms. AG

PEOPLE & COMPANIES

Winchester 94 Restoration

The Winchester 94 is a classic, influential lever action rifle. How much restoration on these rifles is enough to bring them to good shooting condition while maintaining the gun's character?

BY PAUL MAZAN JULY 2023

ORIGINAL PP. 10-12

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We all know the Winchester Model of 1894. It's the iconic lever gun that every other lever action is compared to. I recently found one at a local auction that was pretty well trashed. Here is how I handled the problems it had. What you may not know about the Model 94 is that when it was introduced in 1895 it was offered in two calibers. The 30-30 Winchester Center Fire, of course, is the iconic chambering and the one everyone is familiar with, however, that other chambering is one you may not be familiar with.

No, it was not the 32 Winchester Special as that cartridge didn't come along until 1901 when someone at Winchester thought the old traditional hunters would buy something that allowed them to use blackpowder and cast bullets. As it turned out, many did. The second initial M94 offering was in 25-35 Winchester Center Fire, which is basically a 30-30 WCF case necked down to .25 caliber.

This was a very practical chambering as it allowed those living on farms or rural areas to take everything from rabbits, coyotes, fox, raccoons, and everything else with four legs all the way up to deer. Of course, that was before the deer got so mean and tough that many of today's hunters seem to think they can only take deer with cartridges that say "Magnum" on the headstamp.

In fact, Winchester's other M94 choice seemed such a good idea that Remington copied it and chambered it in their Model 8, the first commercially successful semiauto rifle, and called it the 25 Remington. Unfortunately, the public didn't seem to find the idea as great as Winchester and Remington did. After all, you could shoot those same varmints with a 30-30 WCF and they would be just as dead. Today neither the 25-35 WCF nor the 25 Remington are available as a stock item from any of the major manufacturers.

HOWEVER, THIS IS AN

WINCHESTER 94 RESTORATION CONTINUED

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easy conversion to make by simply running 30-30 brass through a 25-35 die and trimming the case to length, giving you the same versatility on small game as those outdoorsmen enjoyed at the turn of the 20th century. The M94 is so common and so many have been made that I never thought I would find one interesting enough to want for myself. I've owned several of them over the years and have always sold or traded them off for something I found more interesting. It turns out I was wrong, again.

The Winchester 94 I found at a local auction was a saddle ring carbine made in 1906. It is chambered in 25-35, as I'm sure you already guessed, and it was quite well used and in need of some TLC. The finish was long gone, the metal pitted, the stock was split and repaired badly with pins. A dowel rod was put in the wrong place and then removed because it interfered with the mainspring, and wood putty was liberally slathered over the holes and in every dent and gouge in the stock.

The saddle ring was removed and its base had been trimmed down to be no more than a lump on the side of the receiver. I suspect the saddle ring was removed to keep it from making noise when deer hunting but an easier solution would have been to simply put a piece of tape over it for deer season. I started by ordering a replacement pre-64 saddle ring from Jack First Gun Parts (JackFirstInc.com), and used Birchwood Casey Blue & Rust Remover to strip the bluing from the new saddle ring to match the receiver.

The most concerning problem was that the upper tang had been broken and brazed back together with about as much skill as I have with brazing; the attempt had left a lump of brazing material that added to the gun's ugly appearance. At this point I had some decisions to make. I could draw file the pits out of the metal, polish and reblue the gun, put a new stock on it, and turn it into just another 94, but that would destroy the history and character of the gun.

Instead, I decided to let the gun keep the scars it had earned over the past 116 years of use and abuse and simply fix what needed fixing. I didn't find any surprises when the gun was disassembled. There was enough dirt caked on the internal parts that I guessed that it had been 115 years since the last time it was detail cleaned, but I expected that. My main concerns were the brazing job on the tang and the wood putty over the holes on the wrist of the stock.

The lump of brazing metal was easily removed with a file along with careful attention to not cut into the steel of the tang itself. The stock was a bit more difficult. After removing the wood putty, I plugged the holes with dowel rod, however, rather than leaving them like that I used an old technique of removing the wood around the

WINCHESTER 94 RESTORATION CONTINUED

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holes and fitting and gluing a patch made of walnut over the problem areas. Then it was a simple matter to rasp and sand the patches down to the level of the stock and refit the stock to the receiver. I have used a lot of stock finishes in my time and I much prefer finishes that soak into the wood rather than just sit on top of it. Linseed oil and turpentine mixed 50-50 will give you a nice satin finish but is rather labor and time intensive.

In this case I chose a commercial tung oil finish and have to say that I was not happy with it. I've used real tung oil before and it has a distinct odor. As far as I can tell the product I

found locally is designed to give you a finish that looks somewhat like tung oil but doesn't seem to actually have any tung oil in it. Most of us are familiar with Birchwood Casey Tru-Oil Stock Finish and it is a fine product that gives a nice finish.

Frankly, I wish I would have used Tru-Oil on this project as I wanted to duplicate the factory finish and that appears to have been nothing more than varnish. Now I find myself on the horns of a dilemma. Preserve the gun and its history and leave it as it is, or re-finish it and return it to its former glory. The

gun is repaired, it is solid, has a good bore, it works, and it should be left as it is—but it is still ugly!

My job is normally to repair and restore guns that have been used and abused—yet, somehow, I don't feel I have finished this project. It cries out for anew stock and forearm, the pits need to be filed out, and the metal re-blued. Like an old Hollywood actress, there are more call long haul; this old Winchester needs a facelift to look young and pretty again. But, in respect for her age and history I'm trying desperately to convince myself that she is beautiful just the way she is. AG

MEASUREMENT & INSPECTION

Double Trouble: Stevens Model 311

Working on the Stevens Model 311 Series F double barrel shotgun.

BY KENNETH FINLEY JULY 2023

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The first sign of trouble occurred at a Scout-sponsored Cowboy Action event. The shotgun instructor placed two fresh 20 gauge shotshells into the Stevens side-by-side and closed the action. Both barrels went off. Although surprised, no unscout-like words were released into the wild. Since all the safety rules were being followed, the discharges merely expended themselves downrange. A different shotgun was brought to the line, the event continued, and the Stevens was brought to my shop for inspection and work.

The Stevens 311-pattern shotgun is aside-by-side shotgun that you can find under the name Stevens, Savage, or Fox. These shotguns have two triggers and internal hammers. The internals are all pretty much the same among the different nameplates, primary differences being the furniture and finish of the metal work. Barrel lengths range from 26-30 inches. I own a similar example in 12 gauge with 30-inch tubes, full choke on the left and modified choke on the right.

My customer's Stevens Model 311 is a Series Fmodel which have automatically resetting safeties and three-inch chambers. This particular shotgun had birch furniture with a walnut stain, a semi-beavertail forend, blued 28-inch barrels, and color case-hardened receiver. All in all, a very attractive example of the pattern. Upon examination, I found that if you fully opened the shotgun, thereby cocking the internal hammers, the firing pins would retract properly. There was still a problem, however.

Once cocked, pulling the left-hand trigger (the forward trigger) first, the left barrel only would fire. If you then pulled the right-hand trigger (the rear trigger), it would fire normally. If, on the other hand, you pulled the righthand trigger first, both hammers would drop, firing both barrels. This malfunction was consistently repeatable. The receiver side plate clearly indicates the model and series number of the shotgun.

After making sure the shotgun was not loaded, I first removed the semi-beavertail forend to examine the shotgun cocking

mechanism. As is typical of these shotguns with their very heavy hammer springs, opening the shotgun fully to cock the hammers and make sure they are securely engaged on the sears requires some effort. More on that later. Feeling certain everything forward of the breech was functioning within specifications, I decided to remove the stock to expose the lockwork.

The shotgun had been fitted with an aftermarket recoil pad. The rubber was clearly marked where the screws were located. I removed the upper screw holding the recoil pad in place and rotated it down. This gave access to the screw holding the stock in place. Along flat-bladed screwdriver is required remove the stock screw. You will also need to remove the rear trigger guard woodscrew. The stock should easily slide off the upper and lower tangs, revealing the shotgun lockwork.

Note the position of the left and right hammers when in the full cock position. The hammer springs

DOUBLE TROUBLE: STEVENS MODEL 311 CONTINUED

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are very stiff and the weight of the barrels when opening the action actually assist in setting the hammers properly. The hammers are well up inside the receiver shell, along with the cocking lever, mainsprings, and mainspring plungers. Knowing the nightmare involved in removing and replacing hammers in these shotguns, I decided to try working on the triggers and sears first. Note the relationship of the critical lockwork when the shotgun is cocked, ready to fire, and the safety on.

One of my gunsmithing mentors repeatedly said you had to know how things work before you can diagnose problems and repair them. Here you can see the design, function, and repair of the system. In this instance, you see the hammers fully back. Both hammers pivot on the same pivot pin. The sears pivot on their common pivot pin to engage the hammer sear surfaces. The longer arm of the

sears pass outside the triggers and hook inward to rest on the large surfaces of the triggers themselves.

The safety toggle pivots to rest atop an angled surface cast into the extended end of the triggers to keep them from moving. The actual trigger and sear springs are not heavy springs. The hammer springs provide most of the energy in the system. Sliding the safety button forward on the top of the receiver pivots the toggle off the triggers.

Once the toggle is free of the triggers, pulling back on either trigger will cause it to pivot up, which pushes up on the sear causing the other end to pivot down from the hammer notch, releasing the hammer to fall forward to strike the floating firing pin in the breech face of the receiver. Troubleshooting and Remedy Cycling the action where I was able

to watch the parts move, I could see the problem was centered in the left side of the shotgun.

The trigger and sear did not seem to move when the right trigger was pulled, however, both hammers dropped. This told me the triggers were not interacting and the issue was in deeper. The first step was to remove the sears. This is done by punching out the sear pivot pin. In this instance I was very lucky, because the sear about which I was concerned was the left one. It dropped from the receiver before the sear pin was fully removed.

What I found examining the sear was that the lip of the engagement surface of the sear was rounded up and had created a burr on the top side of the sear. The burr kept the sear from dropping fully into the shallow hammer sear notch. This condition resulted in

DOUBLE TROUBLE: STEVENS MODEL 311 CONTINUED

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Punch out from the left side as the right end is knurled. The darkened area shows the heat treatment of the critical sear surface. The upper view shows the sear upside down and give a good view of the necessary angle required for positive engagement with the hammer. The blue coloration at the tip shows the extend of the heat treatment and hardening of the sear surface. The second perspective view shows no side wear that might be causing unwanted movement. the doubling when the right trigger was pulled.

Wanting to replace the sear, I called the usual suspects and found that none were available. I did pick up anew hammer just in case I

needed one. My examination of the existing hammer by camera showed no wear on the notch. I took the original sear and carefully massaged the metal lip back in place. I moved the metal very slowly to avoid damage to the heat treat. Once the top of the sear was returned to its original smoothness, I carefully reangled the sear for a more positive engagement in the hammer sear notch.

As an added precaution, I removed a small amount of material from the sear where it engages the trigger. This allowed the sear spring more play for engaging the hammer. There was a small downside to this solution in the addition of a slight amount of creep to

the left trigger but this was considered acceptable to the customer. Going out to the range and busting a string of clays suggested the shotgun had been returned to reliable function.

As the primary function of the shotgun was as a backup for the Scout Cowboy Action Shooting program there was no knowledge of when it would next be needed. Interestingly, the need arose three weeks into the summer program when the new coach gun started doubling. The old Stevens went back to work, reliably serving over two hundred students during the next five weeks. AG

MAINTENANCE & REPAIR

Steyr Mannlicher SSG

The case of the sticky Steyr. How I found and addressed issues with a Steyr Mannlicher SSG-69 PI bolt action rifle.

BY MARK R. HOLLENSEN JULY 2023

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I had a rifle come into the shop recently that, in most cases, would have had a very simple solution for the problem; at least it typically goes that way. Nine times out of ten, a deep cleaning will remedy the issue. However, this case was different. I decided to write about it as it cuts to the core of what we Gunsmiths do—or should be doing. In our daily efforts to be dedicated to shooters and their guns, we must always remember that no case is routine or ordinary, regardless if the symptom(s) say otherwise.

We often will get calls from customers about certain symptoms or functioning issues that they are experiencing with their firearms, and I think that oftentimes, we can be too quick to try and resolve the purported issues while on the phone with the customer, or when they come into the shop seeking advice but neglect to bring in the firearm itself. And in most cases, we can and do quickly resolve some issues just by giving some good advice based on our experiences.

Unfortunately, we cannot predict when our advice is off the mark, so to speak, and that we have unknowingly put our customer in a dangerous position based on our recommended advice or potential solutions needed to resolve the issues at hand. And so we all must be very careful and put some thought into our responses to a customer

having what seems to be a typical malfunction or problem for which a quick remedy can be offered to resolve it. Let's take a look at this with a recent customer job I took in.

It began with a customer coming into my shop with a Steyr SSG-69 PI. The Steyr SSG 69 was offered in 308 Winchester, 243 Winchester, and a few 22-250 Remington. The rotary box magazine was built for short cases and re-chambering the rifle will present the gun owner and gunsmith with some challenges based on design factors. bolt action rifle chambered in 308 Winchester. This customer is an avid shooter and primarily shoots long range matches every chance he gets.

He is a good shot and is very familiar with firearms, reloading, precision long-range target shooting, and the care of his equipment. In other words, he is in no way a novice to the shooting sports. I have worked with this customer often as he has projects he wants undertaken from time to time that tend to help him get better with his shooting skills. And he likes testing a wide variety of firearms, both handguns and rifles, looking for precision wherever he can find it.

He takes great pride in his collection of fine shooters. Some of those are brand new, special order firearms, while others are "good finds" he ran across while searching

firearm listing websites. He has, however, been burned a number times in the past. Each time it happens, I reiterate that he should try to make those online purchases with sellers that have quite a large number of good reviews, offer returns, and accept credit cards.

Doing this can position himself better when the firearm he just purchased shows up and is not what was listed or described in the seller's listing. I think he is looking for the deal and quickly bypasses the recommendations I have provided to him, and again, this has happened a number of times. Hey, I can only try. Back to the Steyr on the bench.

The customer had run across it on GunBroker.com and it interested him as the SSG-69 is used as a sniper rifle by some military and law enforcement units and by the bolt action long range shooting community. He handed me the rifle and told me that he had taken it to the range and fired only two shots through it.

He said each shot required a "gorilla grip" on the bolt handle to get the bolt to move and subsequently open. Suspecting something was wrong, he stopped shooting it immediately and brought me the rifle along with the factory ammunition he had used and two spent cases that he was finally able to extract and eject.

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He asked me what I thought. Although I suspected it was more than likely a build-up of carbon deposits around the chamber area or some chamber rust pitting, I told him that I would check it out and see what was going on. I'm glad that I did. It would have been easy to dismiss the problem and instruct him to take it home, scrub the barrel and chamber area, and try it again; or to clean it and then try another brand of ammunition to see if it worked better.

In many cases, that would have resolved it but not in every case as one never really knows in advance what is happening without looking first. This rifle sports the double set triggers. Especially because this was the first

time firing a used firearm (bought from a stranger online no less!) you really have no idea what you are getting just by reading the item description and looking at the nice photographs. Often times, an unsuspecting dealer takes a firearm in on trade or buys one for a decent price.

Depending on the size of their operation, they may or may not take time to clean it up, inspect it, or even have a gunsmith on site inspect and function test it.

Needless to say, most used firearms do not get inspected, cleaned, or test fired. In those cases, the dealer simply pho- Tally Manufacturing makes a set of ring mounts that fit this action.

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The mid-body locking lugs can be seen and should always have some fresh grease applied to the lugs when in use to prevent galling and to extend the life of the rifle. Unfortunately, the mid-body locking lugs are considered too weak to put magnum calibers in front of the bolt face. The author, who does some research on what it is and then briefly describes the overall condition of it, provided that he or she even knows.

The firearm then gets listed and the buyer now assumes the responsibility of test firing it and making sure it actually works unless they are diligently committed to taking it to a qualified gunsmith to check it out. Remember, people are buying these guns this way to get a deal on it and spending more money to have it gone over is not good for the bottom line. This is just how it is.

My customer was quite comfortable leaving the rifle with me for a full inspection as he and I had worked on a number of his firearm projects in the past. I asked him if he could return it if I found a serious issue, and he reluctantly revealed that he could not and that he had not purchased his new find with a credit card either; two things I had. What appeared to be a piece of cloth string or hair-like object, which may be hard to see, is a crack visible in the 8 o'clock position of the chamber neck area.

In the same 8 o'clock position, it shows how the crack runs linear and extends into the neck and throat area of the chamber. mentioned to him a number of times due to previous bad purchases made on a "deal" found online. In all of the previous cases, he ended up eating the purchase price as he ultimately didn't pursue getting his money refunded.

In all of those previous cases, I had gone the extra mile to put a full write-up together detailing my findings, along with photographs of the damages or issues, so that he had ammunition to support his request for a refund due to a firearm that was described as "like new" but was internally damaged beyond repair. To me, we owe it to our customers to provide them with this information, in writing, so that they can try to recoup their money in the event of a bad buy.

Rifle Specifics The rifle's name—Steyr Scharfschützengewehr 69 or SSG 69—pretty much sums up what the rifle is: a sharpshooter rifle made by Steyr and adopted by the Austrian Army in 1969. The stamp on the receiver reads "Steyr-Daimler-Puch A. G. Steyr Mannlicher SSG 69" and was imported by Steyr, Grand Rapids, MI. The caliber stamped on the barrel is 308 WIN (7.62x51mm NATO) and this rifle has dou-

ble set triggers. This rifle could also be had chambered in 22-250 Remington and 243 Winchester.

Ammunition is fed from a rotary magazine that fits flush with the bottom of the stock. The stock is made of a synthetic (some declare it was plastic, others say it is fiberglass) and was made with a cold hammer forged barrel. It has a short action, so conversion to a longer cartridge would not work with the rotary magazine, short magazine box, and shorter bolt throw.

The bolt has its locking lugs positioned at the rear (mid section) rather than at the face of the bolt, so this precludes moving it up into a magnum caliber. Research also found that the barrels were not threaded into the receiver. They were pressed in, making a barrel swap something to reconsider. I am sure there are shops out there that will take this on, or can sleeve the barrel to change the caliber and/or twist rate, but I wasn't able to locate one at the time of this writing.

Accuracy was purported to be sub-MOA with acclaims that the rifle produces 0.5" groups. This made it attractive to military and law enforcement groups as a long range capable rifle. It appears that a number of countries made this their primary sniper rifle and there was some chatter about it being adopted by the United States Border

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I suspect when the rifle was forged, it had a hairline crack or gap in the barrel where chambered and over time and shooting, the crack enlarged. Not knowing how deep the crack actually extends into the barrel shank, another shot fired may be the last. She is not fit for duty. Patrol BORTAC specialty unit, although I couldn't verify that as of this writing. Production of the SSG 69 halted in 2015 and was replaced by the SSG 08 platform.

It is reported that the Austrian Army outfitted the SSG 69 with a Kahles ZF69 6x scope and later changed to the Kahles ZF84 10x scope. The scope mounts are clamp on type, as the receiver has the ring/base mounting grooves built in to the receiver (on this model anyway).

It is my understanding that this particular rifle is considered to be a PI (P-one) model, based on being available to the civilian market and the accessories it has on board, which include crude open sights, a fiberglass stock, 25.6" barrel, 1:12" barrel twist rate, double set triggers, and Parkerized finish. The overall weight without the scope is at 8.8 pounds.

Later, a PII (P-two) model was made with the law enforcement community in mind, having a heavier barrel and no sights installed, and still later the PIV (P-four) model was made that is suppressor ready. The Inspection Knowing what the customer had

found while at the range, I began with the basics. I always do the same initial inspection and full function test with every firearm I take into my shop and subsequently do again before it is returned to the customer.

This includes making sure it cocks, locks, the safety works, the sear doesn't let go during stock bump tests, before, during and after applying the safety, etc. I want to know if it works properly and safely. I work the bolt rapidly and basically make sure it works under a number of conditions. This Steyr SSG rifle passed all of those tests with flying colors. Not too bad for a 40+ year old rifle (the date code on the receiver gave the birth date away).

After the full function testing had been completed, I began checking action screw tightness, magazine fitment, bolt operation, and then a look down the bore with a bore light. In this case, everything still looked pretty good; other than the bore was dirty from firing and the chamber appeared to be a little hazy.

So now we just run a clean patch down it and head The burnt powder around the necks of each clearly show a liner "line" burned into the neck telling me that the crack was already in the chamber when my customer fired his first two shots. This was more clearly visible under a lighted magnifying glass. to the range, right? Not so fast.

It pays to do a little more checking before packing up the spotting scope and targets. What I did next is pull the bolt out and visually inspected the chamber with a light.

It was definitely dirty. So, I cleaned the chamber with a chamber brush and then the bore. That alone cleaned up the chamber and bore and with a light I found it to be bright and shiny all the way through. My next step was to check the headspace on the rifle. You don't have to take this step for all rifles, but since I had a set of gauges in my tool box, why not. Both Clymer GO and NO GO gauges were tested in the chamber.

I found that the GO gauge, measuring 1.630" would allow the bolt to fully close, however, it was very snug during closing as compared to closing the bolt without the gauge inserted. Not super tight, but you could feel the bolt drag on the gauge when lowering the handle. Remember, the customer is having problems extracting spent cases so the chamber has to be gone over with some scrutiny. Then I tested the NO GO gauge. This gauge is 1.634" long and the bolt handle didn't even start to close when it was inserted.

Not alarming by itself as the bolt would close on the GO and wouldn't close on the NO GO gauge. With the headspace checked, I turned my attention to

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the ammunition he provided. It was a box of factory 308 Winchester cartridges with the two spent cartridge cases in the box that he had trouble extracting and ejecting. Looking at the cases, I saw quite a bit of burnt powder around the necks of both and both primers were flat, appearing to me that pressures were above normal when they were fired. I compared the cases with the live rounds in the box and noted that the shoulders and necks of both fired cases were much different than the factory shoulder and necks.

But here again, this can be common depending on the chamber reamer that was used to chamber the barrel. That said, something about those two cases bothered me; especially the flattened primers. No signs of excessive headspace mind you, but the pressures seemed to have been higher than what you would expect to see. So now we are ready for the range, right? No, not yet. Based on the sum of my total findings up to this point, I decided to take a closer look at the bore and chamber areas.

I thought maybe carbon build up was still an issue, or rust pitting, or maybe the chamber wasn't cut right from the factory. A chamber reamer used on a number of barrels can wear some and it could be this barrel was the last one to be chambered with that reamer. That said, the gun is 40+ years old and has been used before (based on wear indicators) so maybe it was just carbon buildup or another unknown obstruction in the chamber area.

Once again I used a bore brush and solvent to clean the chamber and bore and then dried it out. Since I have a bore scope, I opted to take a closer look as mentioned previously. I started the scope in from the chamber opening and at first everything looked nice, clean, and shiny. But then I saw something. Maybe it was a hair I thought. So I ran another clean patch down the chamber and bore and then fed

the camera into the chamber again. Slowly moving it into position I found a liner crack in the chamber.

This is something I have not seen before in any firearm I have had in for inspection or with similar issues, and is not a commonly found issue at all. I took a number of photographs of the area so I could get a better view of the crack once the photos were loaded onto my computer. Inspection of those photos confirmed what I thought I had found. It was a linear crack in the chamber at about the 12 o'clock position.

The crack began at the front edge of the shoulder area of the chamber, and then progressed forward through the neck, into the free bored area, and well into one of the grooves of the rifling. Confirmation that there was a crack in the chamber then initiated the process of having to call my customer and let him know about the issue, and that the rifle is unsafe for any use. That is a tough discussion when the customer tells you that he just paid \$1,800 for the rifle and has had bad luck buying online.

Journey to the Destination At this point, I had to write up my findings and include photos so that the customer had a record of the damage. He began by saying that he wasn't going to pursue returning it to the seller, but I let him know that he really needed to contact the seller and Gunbroker.com so they know about it. There are dealers out there that are less than honest and unsuspecting buyers will never know this unless it is reported.

Most dealers are not trying to dump problems on unsuspecting buyers, but there are some that will readily take that chance of getting rid of a problem firearm this way for maximum profit. I think this made sense to my customer and he alerted both the seller and Gunbroker.com of the unsafe rifle he had unknowingly purchased. The seller actually responded rather quickly

and asked for more information and photos of the chamber, for which I gladly provided immediately.

As thought, the seller had no idea that the rifle had a crack in the chamber. Next came the question of whether my customer caused it when he fired the rifle twice. I immediately inspected both spent cases and found a line on the necks of each in the exact same location based on positioning the cases so the primer hits were in the exact same position. That little line or cut in the neck of the chamber clearly showed that when the cartridges were fired, indicated the crack was already present in the chamber.

Photos were taken of that finding and provided to the seller as well. I am pleased to report that the seller asked for the rifle to be returned for a full refund, less the cost of shipping. This was ultimately the point of me writing this article. We as gunsmiths provide services not available anywhere else. And in many cases, not even by other gunsmiths. Yes, it takes time to put all this together and it isn't always high on anyone's list of things to do.

But in order to take our job seriously, and follow the motto of "dedicated to shooters and their guns", we really need to support our customers in this way. And this type of support definitely has a lasting impression on our customers who ultimately tell their shooting buddies how they almost got screwed by a bad purchase but their gunsmith saved the day by enabling them to get their hard earned money refunded even though the listing had no returns prominently displayed in their listing.

There are many lessons to learn from this whole situation, so consider this the next time a customer calls you or stops by without their firearm in hand and asks for advice about an issue he or she is having. The safety of our customer is always the top priority. AG

FROM THE ARCHIVE

Gunsmith Business Competition

The various forms and faces of competition facing you and your gunsmithing business.

BY BILL SMITH JULY 2023

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In these many articles I have constantly tried to direct you, the gunsmith, away from trouble, and toward making a good honest profit from your honest endeavors. Let's start by classifying our major sources of competition. The first are other gunsmiths and other Federal Firearm License holders in your area. Large chain stores (Super Stores, the "SS" of the gun world) that are still selling guns and accessories fall in this as well. Your customers can just as well take their business to them as to you.

Another source are gun companies. Your customers could just as well choose to buy anew gun rather than have a current one repaired or improved. Similarly are gun part houses, gun and accessory jobbers, and local amateur or hobbyist gunsmiths. Perhaps I could stretch this another couple of listings but the above will take a couple of thousand words so let's hold it to that. I have listed the FFL holder as the major contributor to us as a competition. Here's why.

Unless you were the equivalent of Jack the Ripper, back when I started anybody could get an FFL for a few dollars. That has changed somewhat, however, it's still within reach of a determined soul capable of making an application for the FFL that has a business address and hours open to the public. The application assumes you will have that place of business provided and it has a business address more plausible than an old outhouse down by the creek along with the hours you are open.

So much for that, BATFE hasn't got the manpower, time, or, least of all, the inclination to check your adherence to what you put down to get the license. So you can do business in a location the size of a large bathroom for all they care and only be open when you damn well feel like it. With an FFL a person can buy guns, sell guns, trade guns, buy any gun part wanted from anyone, any scope, sight, mount, and whatever else. And now they're your business competitor.

Now all the jobbers, surplus arms and ammo dealers, and anyone else in the gun-associated field will begin contacting the new FFL with lists from which they hope you to sell. An established, legitimate gunsmith shop with thousands of dollars invested in machinery, parts, and the like can start losing on all sorts of jobs because Joe has an FFL and he sold a scope and mounts or did a poor recoil pad installation in his spare time.

Multiply this out a few hundreds of thousands of FFL holders and the total business lost to them is one hell of a lot of money. The spare time FFL holder with none of your tooling pays comparatively little in overhead, fewer taxes, and beats you out of a dinner at Red Lobster, so back to Mc Donald's you go. What do we do? Nothing is the order of the day. Unless gunsmiths become a recognized trade association or licensed profession having a voice with elected officials, this will continue.

We currently have no such voice collectively. I know, but we should have. I'm all for free trade and capitalism but the BATFE

does gun owners a disservice when the qualifications to be a federally licensed dealer are so low, especially as it encourages unqualified people to claim to be gunsmiths while operating out of a shoe box and doing the public a great disservice because they don't know what the hell they are doing except creating competition for the legitimate shop.

Sure, a lot of us started part time but we worked hard to make it full time and we did, but today we have thousands of FFLs "shooting" at us. Gun parts houses will sell any part short of a receiver to anyone, let alone an FFL holder. This is great on one hand as they have to sell parts to stay in business and should be able to sell to whomever they please.

Just remember they don't have a special price or discount for legitimate gunsmiths but the worst thing they do is advise the customer (your customer) what the parts cost at wholesale, which cuts on the margin of a legitimate craftsman. There are too many people, gun owners included, that seem to think the total cost of a repair job should be close to wholesale cost of the parts. Even people without an FFL can buy apart and bring it and the gun in to you for installation.

That's fine as it is a good way to play catch up but there aren't enough of these jobs. We can't stop this type of parts merchandising but it should be recognized and left to you to think about. I have had many a customer come in and tell me that a certain

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gun parts retailer lists a particular part for so much and how much to put it in—again, this is where I get even. The gun media advises every subscriber or reader as to what every gun costs. Customers then expect you to meet that price. Well, step back and smile while thinking all the time.

You can elect to tell him you are just riot interested and gladly order it for him at the wholesale cost, provided the customer puts all the cash up front, including all shipping costs and taxes, along with your reasonable (but still profitable) FFL transfer fee.

This should also include agreement to the terms of your pick up policy in writing which states that they will pay a stocking fee if the firearm is unclaimed after 30 days of being notified it is ready for pick up and that they surrender it to your shop if left unclaimed after 60 days. I would like to handle 100 deals a day like this and have no clue why some shops have oddly restrictive policies on the use of their FFL.

Any prepaid item sent to my shop is like having inventory paid for with someone else's money that I'm all but guaranteed will move within a week of arrival. It's a rare customer that won't promptly come back in to pick up an item they wanted and already paid for and in the unlikely event they don't, I end up with inventory that, again, I didn't have to pay for. Should your customer tell you he has a friend who has an FFL and he will do it for free, smile at him and say, "Great! I suggest you do that.

It's a good deal." Just remember this when you go to renew your subscription to whatever newspaper or magazine he got the information from and when he needs it fixed, get even, but do so with good service and a smile. Competition with other gunsmiths in your area can be handled in an easy way. First off, a competing gunsmith in your area is automatically a skilled craftsman and a nice fellow. Make sure you keep saying so for in this way he can't run you down.

If he does, the person who has heard you say complimentary things will question the competitor trying to give you a bad name. This assumes those uncomplimentary statements by a competing gunsmith have no basis in reality. Just say he is also a good gunsmith, just that you area different kind of gunsmith and let your customer decide. Hell, you are the best (right?) so why worry about this one? Get a custom job or blue job into your customer's hands. Ask him, "Isn't that nice?

That's the kind of work I do." If you truly area good gunsmith, no more need be said. Gun companies are also your competition. This might seem odd as a gunsmith because if they didn't make guns we wouldn't have anything to repair or modify. Like gun parts stores, gun companies will also sell parts to anyone with few exceptions. The trend is to publish an authorized repair station list but more than likely you are not on it.

A list of names of gunsmiths and their qualifications are put out by organizations such as the American Custom Gunmakers Guild and American Pistolsmiths Guild but most of the gun buying public knows nothing of it. The SS among us (Super Stores) are the huge businesses with chains of stores. These stores may have a gunsmith on staff that can mount any sight, swivel, recoil pad, etc. bought there.

Now, this isn't a bad thing, especially when you realize that these stores are taking the graduates of the various gunsmithing schools out of your hair, competition wise, as well as purveyors of questionable capabilities (in spite of a diploma) off the streets where in the SS they can continue to screw things up so that you get the corrective work. Remember one thing: these stores don't really want a gunsmith on duty.

It is a low profit operation for them and they have him only to keep their customer from having to go elsewhere. They are not going to pay for the best, seasoned gun-

smith they can find. Instead, they will hire the guy that yesterday couldn't spell the word gunsmith but today he are one. The graduates of the "Become a Gun Expert in 60 days" can find homes there. Finally, is the local amateur or hobbyist gunsmith. Now, every experienced gunsmith used to be an inexperienced one.

The only way to get good at anything is to do it. The problem is when this leads the unapprenticed hobbyist to decide they're "ready" and branch out into business. If you're a good gunsmith and a good businessman (and you need to be both) you've learned to price your services based on the value your experience and skill provides for the work you do. The newbie that just threw out a shingle reading "Gunsmith" written in still undried paint can't know those things.

They'll likely price things to bait new customers while remaining unaware of how much time, effort, and costa given job is likely to be. As discussed above, you're best bet is to not speak ill of competition, however, unlike the experienced gunsmith that is always a fine fellow, you can honestly say, "I'm not familiar with his work" of the freshly-shingled hobbyist. Your potential customers that decide they'd rather bite on a "deal" to save a few dollars can have their guns serve as the new guy's test subjects.

This could end up driving more business back to you in the long run. The only way an independent gunsmith can successfully compete is to be fully qualified. This takes constant study and practice. The more competent you are, the more you prosper and get the business. Recognize where competition for your customers is coming from. If you are truly the real deal, it should become obvious to all of your customers that you really don't have valid competition. AG

TOOLS & FIXTURES

Reader Forum

BY AMERICAN GUNSMITH EDITORS JULY 2023

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Ballistol I am a satisfied subscriber, former mechanic, and journeyman tool maker. Brian Smith's "Corrosion Basics for Gunsmiths" (February 2023) was very informative and comes across as authoritative. I feel I learned a lot from it but have a question about his comments regarding Ballistol. Ballistol contains a solvent and lanolin. How does that act like an electrolyte? I have used lanolinbased products on my 1-2-3 blocks, bench irons, and grinding vises for years with no corrosion showing.

My blocks and vises spent time in wire EDM machines with no ill effects. We even coated the machine cutting areas with lanolin-containing sprays after deep cleaning. I'm also told that the Navy uses Fluid Film lanolin spray on areas of their ships for corrosion prevention by the product rep. I would expect if the product was an electrolyte, the Navy engineers would forgo its use in salt water environments. Mr.

Smith clearly knows a thing or two about corrosion control, so I'm hoping for an explanation and maybe an expansion of the topic. Dave

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Author Brian Smith responds. Thank you for your interest in and kind words regarding my article. To clarify, my article comments about Ballistol—the neat product by itself—is not electrically conductive and thus is not an electrolyte. The Safety Data Sheets which I referenced in researching Ballistol state that it contains pharmaceuticalgrade white mineral oil and butyl alcohol. Butyl alcohol is an effective emulsifier which facilitates dispersal of water in oil, or vice-versa.

If a user of Ballistol mixed enough water with the product, then the emulsified mixture could become electrically conductive to the point that corrosion could occur. As the article stated, in my opinion the ability of Ballistol to become emulsified with water isn't an advantage when it comes to corrosion protection. Oils have been used as moisture and oxygen blocking agents to promote corrosion protection for centuries.

While neat, Ballistol has a proven track record among firearms owners as a corrosion inhibitor, an oil-based product with the ability to become mixed or readily emulsified with water seems to defeat the purpose or post a letter to Falls Church, VA 22041. subscription For questions or mailing problems contact American Gunsmith

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