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EDITION

PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

A TECHNICAL JOURNAL OF CRAFT, REPAIR & RESTORATION

03

ARCHIVE ISSUE NUMBER

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TORMACH PCNC • ROGERS & SPENCER REVOLVER • NEW EYES FOR AN OLD WOODSMAN • ACCURIZING SAVAGE MODEL ...

ORIGINAL METHODS. MODERN ACCESS.

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DIGITAL ARCHIVE EDITION

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MACHINING

Tormach PCNC

BY AMERICAN GUNSMITH EDITORS MARCH 2020

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Tormach Inc. (Tormach.com), is a maker of Computer Numerical Control machine tools affordable for individuals and small shops. Ideal for gunsmiths, inventors, R&D professionals, or small manufacturers, Tormach brings CNC automation down to reachable price points. New to their Personal CNC milling machines are the 1100MX and 770MX. The new MX series are servo-driven versions of the company's best-selling two mills, the 1100M and 770M, which were introduced in 2018.

Tormach PCNC The new MX series of machines feature an added encoder to the spindle for rigid tapping, a BT-30 spindle, and servos for the X, Y, and Z axes. The servos provide much faster performance with maximum speeds up to 10,000 rpm and feed rates as much as 2.5-3x faster than the Mseries machines.

When combined with Tormach's Path Pilot CNC Controller, which provides users with numerous premium features as standard, these machines provide the highest performance and most cost-effective machining solutions on the market today. In addition, Tormach has launched anew Path Pilot Operator Console upgrade. This is available for both Tormach MX and M Mills.

The all-in-one Path Pilot Operator Console allows users to operate their Mor MX machines via a touchscreen, has built-in hardware knobs for feed and speed overrides, and a durable hand-held jog pendant for precise manual positioning of the machine. "Our customers have been waiting and we are happy to announce the availability of these new machines and the option of a Path Pilot Operator Console," said Matt Berggruen, Tormach Product Engineer. "They offer tremendous performance and value for the price."

Introductory packages start at \$17,995 for the 770MX and \$19,995 for the 1100MX." The new 1100MX and 770MX machines work well for prototyping, job shops (shorter runs and/or as a machine to handle secondary operations), education and tech schools, and enthusiasts interested in using CNC. Like the M Series of machines, the 1100MX and 770MX have the power to cut the toughest materials—stainless steel, titanium and even pre-hardened tool steel—but now with even higher power and faster speeds.

Tormach has videos about these machines on their website (Tormach.com) or You Tube. To help new users of CNC machines, Tormach offers pre-sales consultation and CNC Workshops. Their Path Pilot CNC control software can be learned online via their Path Pilot HUB website (hub.PathPilot.com).

PISTOLS

Rogers & Spencer Revolver

Working on the Rogers & Spencer .44 revolver converted to centerfire from percussion caps and blackpowder.

BY MARK R. HOLLENSEN MARCH 2020

ORIGINAL PP. 3-7

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Ve I had a few of these Civil War era revolvers come into the shop lately, with this one being complete (no missing parts) and it functioned properly. The others were missing the mainspring and other screws and internal parts, and as you well know, parts for these old revolvers are pretty much extinct.

The owner of this revolver brought it to me to remove a cleaning patch that had become lodged in the cylinder and barrel, and he asked that it be completely disassembled for a deep cleaning and to determine if it was an all-numbers matching revolver. I say revolver, because often black powder guns are often referred to as "pistols" and I found this terminology used when doing research on this particular "modified" gun.

Going back to the beginning, it was around 1837 when Amos Rogers and Julius Spencer began making farm machinery as their business, reportedly making guns as a sideline. Based on C. S. Pettengill's patent of 1856, the two began making .31 and .34 caliber revolvers. Later, the two took over the Pettengill patent and formed their own business named the Rogers, Spencer &

Company. The early Pettengill revolver was simply a self-cocking revolver with an enclosed hammer.

Rogers & Spencer made reportedly 5,000 of these revolvers but they were deemed to be unsuitable for use by the military and the contract was purportedly canceled. In 1864, Rogers & Spencer began making revolvers to compete against Remington and Colt, making black powder revolvers. A total of 5,000 of their black powder re-44 caliber six-shot revolver. After being produced, it was converted to shoot centerfire cartridges. revolvers were produced and sent to Ordnance on September 26, 1865.

However, there are no records indicating that these revolvers were ever issued to the troops as the Civil War ended. The guns were reportedly placed into storage and later sold to a merchant named Francis Bannerman. Each percussion gun had 7.5" octagon barrels, held six shots, and offered in .44 caliber (blackpowder). Bannerman reportedly sold them at low prices until all were distributed. There are reports that many of these guns are in pristine condition, however, I have not seen one (in person) as of yet.

Continuing my research on these Civil War era revolvers, I found that many had later been converted to accept straight wall centerfire cartridges. There was mention of Rogers & Spencer doing some conversions, along with frontier gunsmiths of the time period. And it is speculated (and reported) that there were at least four different types of conversion methods performed on the revolvers. My research found only three different conversions.

One was to convert the gun to centerfire by adding a recoil plate, extending the back of the cylinder/chamber area, inserting a pin on the nose of the hammer, and drilling through the recoil shield so that the firing pin would protrude to hit the centerfire cartridges. They had also added a loading gate. Another conversion was to make the changes and convert the revolver to .44 Rimfire.

The third conversion I located had a split-cylinder chamber area and a center pin installed in place of the original cylinder pin/bullet seat assembly. This split cylinder has a gap between the rear and front portion of the cylinder. In the case of the revolver on my bench today, it sports the first

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The cylinder can now be removed from the right side. conversion process listed above. The complete conversion was not an afterthought and was very well done based upon the work and effort placed into making it a centerfire revolver. The cylinder was lengthened and that added portion was cleanly pinned to the original cylinder. The recoil shield was also made to fit the frame and was also carefully and cleanly pinned to the front of the recoil shield area. No loading gate was installed on this gun.

The flat nosed hammer had the firing pin silver soldered into it so that it would pass through the recoil shield and strike the primers of the centerfire rounds. The odd part is that the original center pin/bullet seat assembly was left fully intact as it was originally installed on the percussion revolvers. The bullet seat has no use on a centerfire revolver and cannot be used to remove spent cases from the cylinder. However, the cylinder pin/bullet seat assembly is used to hold the cylinder in place.

Measuring the chambers, it was difficult to determine what cartridge specifically the cylinder was converted to shoot. Measuring each chamber, I found none were fully concentric and all had varying diameters. The chambers would not accept a .44-40 cartridge, nor a .44 Magnum or .44 Special cartridge either, and was way too small in diameter to accept a .45 Long Colt round.

So, looking at the era in which the conversions took place, my opinion is that this revolver was converted to fire the .44 S&W Russian cartridge. This is based on chamber dimensions mostly. The chambers averaged 0.458" to 0.461" in diameter where the body of the cartridge would seat. And a .44 S&W Russian cartridge fully seated and chambered into each chamber when tested.

A look at the .44 S&W American cartridge (also a favorite of that time period) found that it was rather small for the chambers reamed on this revolver, so I discounted that cartridge. The bore measured well beyond the typical .44 caliber diameter of 0.429-

0.431, coming in at 0.435. Therefore, modern .44 caliber bullets would skip down the barrel if used today.

Although these guns were considered strong during their time, and even with the addition of a recoil plate, I would recommend that these guns not be fired again—ever. The metallurgy of that time, and the fact that low pressure black powder was the common powder of the day, means that today's powders would probably far exceed all pressures that this revolver was originally intended to receive. Just because it is mechanically capable doesn't mean load her up and start banging away.

Disassembly and Inspection Since the customer wanted everything inspected for originality, to determine if the serial numbers all matched and that the revolver was still in original "converted" firing condition, it was completely disassembled, deep cleaned, lubricated, and reassembled. So, if you take one in missing parts or is simply Far This extension is pinned to the cylinder.

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This is not commonly broken but the front trigger guard screw secures it in place. In a plastic bag completely disassembled, here is a firing order you can go by. As always, begin by making absolutely certain that the gun is not loaded. This is especially important if someone along the way seated a powder charge and bullet in the cylinder (one or more chambers) as you will want to get that charge out before going too much further.

This gun had a cleaning patch stuck in the bore and chamber and it first appeared to me to have alive charge stuck in that chamber. But removal of the patch found it was nothing more than that. This spring is fragile and many are found broken. The cylinder bolt stop is nested with the trigger and held in place by the trigger screw. Getting started, begin (after making sure it is unloaded) by turning the frame screw on the left side of the frame forward of the cylinder 1/4 turn counter-clockwise only.

Once this has been accomplished, unhook the cylinder pin detent from the loop under the barrel and withdraw the cylinder pin/bullet seat assembly forward and out of the frame. Now, cock the hammer rearward just a little bit (enough to drop the cylinder bolt stop downward) so that the cylinder can be removed out from the right side of the frame.

These steps are all that are needed when performing Moving on, you can disassemble the cylinder pin/bullet seat assembly by removing the screw that secures the cylinder pin to the assembly, then remove the screw that secures the bullet seat to the assembly. Finally, drift the small pin out at the nose of the cylinder pin assembly from right to left to release the cylinder pin detent and coil spring. This completes disassembly of the cylinder pin/bullet seat assembly.

Turning our attention back to the frame, begin by removing the grip screw and both grip panels. Under the grip panels you will see the

serial number stamped into each grip, so you will know if the grips on the gun in front of you came from that same gun or not. You will also see the serial number on the cylinder pin yoke you removed and disassembled previously.

With the grips removed, cock the hammer fully to the rear (as far as you can pull it back) and then insert a wooden dowel in between the top of the mainspring and the top rear of the back strap. The dowel will hold the mainspring in a compressed position for easier removal and reassembly routine cleaning and maintenance. Simply reassemble in reverse. assembly of the trigger guard/ back strap assembly. With the dowel in place, hold the hammer and pull the trigger, lowering the hammer fully downward.

THIS RELEASES THE HAMMER STIR-

ROGERS & SPENCER REVOLVER CONTINUED

ORIGINAL PAGE 6

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The pins are located at the 8, 3, and 10 o'clock positions as they are hard to see in the photo. You can also see the hole drilled through the top of the shield to allow the firing pin to pass through and hit the centerfire primers. If you need to make this spring, this photo should help with designing the needed shape. rup from the mainspring hooks so that further disassembly can be accomplished.

Loosen the front trigger guard screw, then the two back strap attaching screws located on the left side of the frame (rearward of the hammer screw). Once all are loose, remove the front trigger guard screw completely and then the remaining two back strap. Whatever they did, it works! screws. Now work the back strap up and downward while pulling rearward to remove and release it from the frame and set aside.

You will notice once the trigger guard/back strap assembly has been removed that the cylinder bolt and trigger return spring is sim-

ply laying in place and can be removed by turning the frame upright and dumping this two-legged spring out. Remove the hammer screw from the left side of the frame and cock the hammer rearward fully. Pull downward on the hammer to remove it along with the attached cylinder hand and spring assembly from the receiver.

The cylinder hand assembly is pinned to the hammer but pulls off easily. This is one of the most common broken parts found on the Rogers & Spencer guns along with the mainspring. With the hammer and hand assembly removed, remove the trigger retaining screw from the left side of the frame. Once the screw is out, grasp the trigger and pull downward to remove the trigger and the cylinder bolt underneath of it. Note how the two interact with each other when reassembled.

The trigger screw also secures the cylinder bolt to the frame. The only other screw left is the cylinder pin/bullet seat assembly frame screw that you turned 1/4 of a turn at the be-

ginning to remove the assembly. This screw is staked in place in the frame and should only be removed when absolutely necessary. This completes disassembly of the revolver. Reassembly is in reverse.

One tip here: when installing the trigger guard/back strap assembly back onto the frame, begin by making sure that the hammer screw is loose, then rotate the back strap enough so that you can capture the hammer stirrup onto the mainspring hooks, then, rotate the back strap assembly into the frame. Don't forget to install the cylinder bolt/trigger return spring before fully seating the trigger guard/back strap assembly to the frame.

You may find it difficult to align both back strap holes for acceptance of the screws. Go slow here and use pressure on the back strap to ensure that both holes are aligned properly with the frame before seating the screws. You don't want to force the screws



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This is the one and only schematic I was able to locate. Even without the parts list, it does help in identifying everything. In or put them in a bind when inserting them into the frame. Once all three screws are aligned and started, tighten the front trigger screw first, and then tighten the two back strap screw fully. As stated previously, missing parts and broken mainsprings or hand springs seem to be the most commonly-found issue with these guns.

Because there are no parts (or almost no original parts) left, you need to decide on whether you will take one of these in for repair. I did find that some parts are available (aftermarket) from Dixie Gun Works (DixieGunWorks.com), so depending upon what is missing or broken, they may have one in stock. The mainspring can be made if necessary, and it is very beneficial to you if the original broken one is still contained in the trigger guard by the grip panels.

If not, you will have to make one without a comparative model available. The photo of the mainspring in this arti- Rogers & Spencer Revolver (Specifications subject

to change without notice) cle should help give you an approximate shape, dimension, and more importantly, the shape and contour of the hammer stirrup hooks. As for the hand assembly, if the hand is still serviceable, you can simply cut and shape anew flat spring and insert it into the slot on the hand to replace a broken spring.

It was rather nice having a complete and numbers-matching Rogers & Spencer .44 come through the shop finally. And speaking of that, you will find the serial number on the bottom of the barrel, the left side of the frame, the bottom of the back strap below the grips, on both grip panels, and on the cylinder pin/bullet seat assembly when checking for a matching numbers gun.

The conversion done on this revolver was very well constructed and no doubt, took some quality time to make and convert to a cartridge shooting specimen. In the mean time, I will be searching for that fourth conversion type I had read about... AG

FINISHING

New Eyes for an Old Woodsman

Upgrading an old iron sight pistol with modern reflex sights.

BY ROBERT COLES MARCH 2020

ORIGINAL PP. 8-9

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You never know what someone will bring in and slide over on the counter.

I opened the case and a classic Colt Woodsman Target Model .22LR wearing a very good blued finish was neatly tucked in a foam insert. This pistol was obviously well cared for and the owner wanted better sights since his aging eyes of 87 years couldn't focus well enough to acquire good sight alignment. He did mention that whatever work I did, I couldn't reduce any value to the pistol.

With a fixed front blade sight and an adjustable target rear sight I started with the normal questions. What's the price cap on this project? Are you okay with better irons or do you want an optic? His eyes squinted, "An optic, like a scope?" I began to cover the benefits of a reflex sight as seen on so many pistols today, explaining dot sizes, their purpose, and that once zeroed the dot can be anywhere in the viewing window.

He was sold on the reflex sight suggestion as aiming would be just as easy as placing the dot on the critter and sending some lead. I made the commitment to not reduce

the value of the pistol. Any idea of drilling and tapping mounting holes in the slide would not happen. I removed the rear adjustable target sight to expose a 4mm deep groove that housed a slide stop plunger and a 6-64 sight elevation screw hole along with across pin hole.

After searching the Internet I didn't find any bases available for this model, so milling a block of steel was my only option. It would serve as an optic base and could be placed in the 4mm deep groove secured by the 6-64 screw and an additional use of the cross pin would keep the base solid with the slide. Keeping the rear target sight complete, I ordered another 6-64 screw (part # 184600) from Numrich (GunParts-Corp.com, The base I made started out as a block of scrap steel measuring 1.5 x 1.25 x 10/32".

First, the base insert needed to be fit to the slide groove and a sight deck thickness determined. With the use of 6-48 screws to mount the reflex sight, I made the sight base deck a thickness of 0.106". Milling the block of steel with a strip measuring 0.157"

wide and 4mm tall ended up with a "T" shaped base that fit the slide groove. A feature of the Woodsman slide is a button slide stop located in the groove where I planned to mount the new sight base.

This button is used to lock back the slide when no magazine is inserted, however, the slide can be locked back with an empty magazine inserted and then removed after the slide is locked to allow that function. I first needed to determine the measurement of the 6-64 screw hole in the new base and that was 0.452" from the rear of the new base. The 6-64 clearance hole was the reference point for two additional hole locations on the new base.

With the base drilled for the 6-64 mounting screw I measured the slide stop clearance hole at 0.474" further forward and drilled a 0.200" diameter hole to a depth of 4mm, as not to drill through the sight base deck. The slide stop button clearance hole in the new base only cut halfway into the 0.157" wide sight base as the lateral centers are 0.109" apart. Fitting the new sight base required filing to contour the front

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bottom portion of the new sight base to fit the slide groove. With both clearance holes drilled, I counter sunk the 6-64 screw for a proper thread depth engagement into the slide and test fit. Careful filing and fitting gave a snug fit of the new sight base into the slide groove. With the base installed, I center punched the cross-pin hole location, removed the base, and drilled a 0.060" clearance hole for the cross pin.

Once satisfied with the new sight base fit into the slide groove, I looked for a reflex sight to determine the position of the two 6-48 deck holes. Wanting a reflex sight with simple to use functions and one button push for all operations, I found the ADE Optics (ADEadvancedOptics.com, Crusader (# rd3-009) and ordered it from OpticsFactory.com. The sight base deck was oversized for a mini

reflex sight, allowing centering the optic and then marking the holes to be drilled and tapped.

Once the 6-48 holes were finished, I shortened the reflex sight mounting screws for a flush fit to the bottom side of the sight base deck. With the reflex sight mounted, I scribed a line around the reflex sight on the base deck to serve as a reference line while filing excess material away. With the new sight base finished and smoothed, I applied Brownells Oxpho-Blue (#082-024-032WB). I have been using this cold blue for many years and am very happy with the durability and finish.

The reflex sight was installed and a range trip was up next to zero the optic at 25 yards. Adjustments were quick and positive. After zeroing the Woodsman I ran a full magazine of .22LR into a Shoot-N-See target to present

to the owner along with the newly converted pistol. Upon delivery of the pistol I demonstrated the features of the reflex sight and then had him run through the functions for me. With his arm extended as to sight the pistol he said, "I don't see a dot.

Doesn't it work?" I smiled and told him to very slightly tip the barrel down, as this is common when switching from irons to a reflex sight. Once the dot was visible to him in the screen, the expression on his face told me we had another reflex sight convert! Conclusion As with any project that is somewhat unusual, creativity and vision will most likely have you delivering a quality product.

This Colt Woodsman pistol now fitted with a modern reflex sight will likely see more enjoyable time in the hands of an old Woodsman with new eyes. AG

FROM THE ARCHIVE

Scope Mounting for Accuracy

A well-mounted optic maximizes precision potential of the scope and the firearm it's mounted to. Here's how to do it right.

BY DAVID W. MANNEY MARCH 2020

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I started gathering information and writing this article just before hunting season here in the Northwoods of Wisconsin in 2017. Then life threw me a curve ball and kept me out of my gunsmith shop for a few years. At that time there was a rush for everyone to get their gun fixed or cleaned from last season. Missed shots was a big complaint for the year, along with the number of botched scope mountings that seemed unusually high also.

I have long lost count of the mis-mounted or ruined scopes that have come through the shop over the years. I've also never understood why someone would buy an expensive gun (i.e., Browning BAR) only to mount upon it an inexpensive scope (Tasco) with even cheaper rings (no-name generic) with even cheaper rings (no-name generic) with even cheaper rings (no-name generic).

Too many gun owners will not learn how to properly mount an optic, refuse to pay a gunsmith to do it for them, use cheap scopes and rings, and then wonder why this combination doesn't perform very well. It's a good reason why "bad" guns get sold off after a hunt. As an example of the poor setups that have been in my shop, one shot six feet to the left and four feet low, and had no adjustment left in the scope.

To be this far off, 0.01" of alignment error at the gun is 1 MOA, so to be six feet off at 100 yards is 0.72" of rifle-to-optic misalignment, enough to be easy to see how off center the scope was to the barrel while looking down at the gun from above. Another case, a nice Nikon scope was ruined by misaligned rings that dented the barrel and broke the internal windage parts so that the reticle flopped back and forth. Nikon was nice enough to rebuild the scope for free.

Most problems with a scope holding point of aim can be tracked back Dial caliper, center punch, inchpound torque wrench, ring wrench, scope alignment rods, ring reamer, ring lapping tool, scope level, laser bore-sight, one-inch and/or 30mm alignment tube. to a poor job of mounting the scope. Bad ring alignment will cause accuracy-robbing stresses which pull and twist the scope and cause it to move and lose alignment. The can also cause bullet point of impact changes over time or even while sighting in the gun.

The scope should be mounted as low as possible, without the objective bell housing touching the barrel. Enough room for a scope cover plus 0.100" is ideal. Seethrough mounts, while allowing the use of the fixed sights, raise the scope up high and introduce parallax error by being too high. The bolt handle should also clear the ocular bell by 0.100" or more. The scope, rings, and bases all need to be matched not only to the gun, but also the shooter. Sometimes

SCOPE MOUNTING FOR ACCURACY CONTINUED

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Original caption: Top: Holes drilled for a one piece base. Notice that center screw hole is canted.

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Original caption: Bottom: Another Mauser with holes drilled for a two-piece base.

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higher rings may be needed to put the scope in line with the shooter's eye. While on the subject of fitting, the length of pull will also affect this as well. Some key things are to make sure there is enough elevation and windage left in the scope to be able to cover possible ammunition and ranges that the gun will be used in. Make sure the bases are solidly mounted, rings are straight, and the scope is in line with the barrel. The reticle also needs to be level to remove inaccuracies caused by parallax error.

What I'm writing here is not the absolute gospel on mounting scopes. This is based on my experiences in mounting scopes over the years. Some of this is overkill for mounting a scope on a .22 plinker or a beater setup, however, those who shoot long distance or target competition need a solidly-mounted scope. No matter how good an optic it may be, an improperly-installed scope will never give good results. Properly installed, however, will take inaccuracy of the optics away—as in the bases, rings, and scope.

I prefer a single base with a turn-in front ring and rear windage adjustment, like the Leopold ones. If I cannot use that, a Weaver-style two piece with windage-adjustable rear

rings is my second choice. My intention is to give enough information for you to successfully use this in your shop. With so much stuff on the Internet now, some people will watch a You Tube video and think that they know it all. Someday, I should thank the Internet community for keeping me in business.

Equipment and Material One cannot perform an excellent job with bad tools. I have been burned by cheap tools and usually at the time I can least afford to have the tool fail. In the first picture, this is what I use to mount a scope. While I do not endorse any one brand or company, this is what I have come to use as I know the tools will not let me down. A dial caliper to measure

The rear holes are not in line with the front holes. the scope, rings, and bases, a center punch to mark the rings for maintaining proper position, a torque wrench adjustable and in inchpounds, a ring wrench for turning in scope rings safely (a wooden dowel can be used instead), scope alignment rods for checking ring alignment, a ring reamer to cut the rings straight, a ring lapping tool to lap the rings, scope level to make it easy to level the scope, a laser sight to boresight zero the

scope and be on paper at 100 yards, and a oneinch or 30mm tube to check ring alignment to barrel.

Additionally, I like to have the following kits I purchased from Brownells. A Torx Scope Ring & Base Screw kit (080-924-000), Tactical Scope Base Conversion kit (080- 912-001), Scope Shim kit (080-814- 000), and Socket Head Scope Ring & Base Screw kit (080-574-000). I do not like using slotted or cross point screws for mounting and will change these out for Torx.

The Torx is easier to use a torque wrench on and doesn't leave marks on the ring from the screwdriver scraping the edge or slipping over the head of the screw. Both area sign of sloppy workmanship and a turn off to the customer. As an alternative, hex head screws will work as well. Preliminary If the scope is mounted, take everything off: scope, rings and base(s).

I was taught in gun school to lay a three-foot straight edge across the center line of the holes for the bases, checking to see if they are inline, as well as aligned with the bore. However, there is a better way Far

SCOPE MOUNTING FOR ACCURACY CONTINUED

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I was able to slip the penny under the base. to do this check. Take some 1" long screws that fit the holes in the receiver and screw them in. There are 1" screws in both the Torx and Socket head kits. Now, look from the rear and side to see if the holes are inline, inline with the barrel, and drilled perpendicular to the top of the receiver. If everything is in alignment you are in good shape, otherwise you have to correct this issue.

If the holes are slightly off center, using bases with windage adjustment will compensate for this. Be aware of the fact that no rifle bore is exactly centered in the barrel of any gun. I have seen brand new guns from Remington, Winchester, Ruger, and others having holes drilled bad enough the bases could not be screwed on. There are a few options available to correct. There is a 0.183" gap between the straight edge and the rear base. This required shims and Acraglas to make a solid rear base.

Gun removed from picture for clarity. The front ring still needs to be turned in some more. this issue. The best way is to weld up

the bad holes and drill and tap them again. In doing this, the receiver will require rebluing the area of the welding and drilling, at a minimum. Another solution would be to go to a larger size screw like the 8-40, if the holes are not too far off. Mill the new holes in the correct spot and tap.

This is what I usually prefer to do, as the 8-40 is a stronger screw and does not work loose as easily as the 6-48. Quite a few manufacturers are now going to this larger size. This is also the reason I have the Tactical Scope Base Conversion kit. It has everything needed to convert the holes of the receiver and bases with. A recent project involved two different Mausers that had been done in someone's garage or basement with a hand drill.

On one, the rear hole could not be seen in the new base and was canted to the right. Both of them required that all the holes be welded up and redrilled. Check the Scope. If mounting a used scope the reticle will need to be centered. This is also true for rebuilt

scopes from the factory, I once received one with the windage all the way to the left. To do this, make a jig with two V-blocks at the end of a 2x4 that is three-inches long. The end pieces need to have a 90-degree cut to hold the scope on the main tube.

This is just a simple cradle to hold the scope on. I made mine to clamp into a vise. Put the scope on the jig. While looking through it, slowly rotate the scope 180 degrees. If the center of the reticle rotates in a circle, it is not centered. Start with the up or right adjustment to center the reticle. It will take some practice but you should be able to center a scope quickly once you get the hang of it. This will also prove if you have a bad scope.

New scopes should not need this as they come centered from the factory, though it is a good practice to always check. While I have not seen this, I have

SCOPE MOUNTING FOR ACCURACY CONTINUED

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This is where lapping comes into play to correct this. I heard from others of scopes left uncentered from the factory. Mount the Bases. Make sure the bases fit the gun. I have one in the shop right now that has bases for the wrong gun on it and the ring elevation is off so much there were four pieces of sandpaper under the rear base to raise it up high enough. Another case was a Mauser with its receiver rear having the charging bridge ground off. I could fit a penny under the base with the front screws installed.

This required a twopiece base with shims to correct. Nothing against manufacturers of the bases, but even the best do not always fit perfectly on a gun. With a one-piece base, mount it with the front screws only and see if there is a gap between the base and the receiver. Then put in the rear only and see if there is a gap. Any gap is going to cause stresses in the base. If there is a small gap, lap the high side using 400 grit sand paper laid on the receiver.

To prevent scratch- I highlight the dimples with permanent marker to see them. Do this on one side and in the center. You will always

be able to put them back where they came off. In the receiver, tape off the edges that hang down the sides and tape those to the receiver to keep it from moving. Lap the base until there is no gap. With large gaps, shimming is the only way to correct and have a firm base. Check the screws going through the receiver do not interfere with any moving parts.

Grind these down for clearance as necessary. With two piece bases, mount the bases on the gun and then use a straight edge across the top. Check to make sure it doesn't rock. If not straight and level, lap the high base until it is straight and doesn't rock anymore. Also, do a visual check to make sure the bases are not canted up or down. Lay a straight edge on the front base. If there is a gap, shimming is the only way to correct this and a good reason to have the scope shim kit.

I like to bed the bases to the gun so I know there is full contact between the base and the gun. Glass bedding from Brownells works great; mix up a small batch and dye it black. Put release agent on the receiver, screws, and the holes. Put Acraglas on the base with any

shims and torque down to 20 inch-pounds. While it is setting up, remove the excess. This will also hold the shims in place. Once cured, remove the base and clean up the release agent.

Once the bases are flat and level with the receiver, degrease the holes and screws. Lightly oil the top of the receiver and the bottom of the bases to prevent rusting in the future. Do not oil the screws and make sure the holes are oil free. Torque the screws down to the specifications given by the manufacture. If there aren't any specifications, use 20-25 inch-pounds for steel bases and 15-18 inch-pounds for aluminum bases. Do not over torque as the strain will be on the screw shank and will cause it to fail.

Once the torque wrench breaks, do not be tempted to go back and retighten. You have already put enough to hold it in place. Blue thread lock can be applied if not already done by the base manufacture. Double check again to see if the screws are too long. You do not want to have to pull everything off

SCOPE MOUNTING FOR ACCURACY CONTINUED

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Notice how uneven the cut starts. This is what puts dents in scope tubes. because a screw will not let the bolt slide into the receiver. Ring Set Up The scope should be as low as possible to the barrel while allowing the shooter to bring their eye easily in line with it. With most setups, this means using medium rings for a 1" tube 3x9 scope. Midway USA, Brownells, Weaver, Leopold, and others all have charts on how to figure what rings to use. The lower the scope, the easier it is to get the elevation correct.

As a general guide, use the objective lens diameter plus the lens cover. At 20-24mm (0.787- 0.944") use LOW rings. If there is a bolt handle, ensure there is clearance. For 25-36mm (0.984-1.417") also use LOW rings while being aware the barrel may be an issue if it is heavy or thick. At 37-44mm (1.456-1.732") use MEDIUM rings, 45-50mm (1.771- 1.968") uses HIGH rings, and 51mm plus (2") uses EXTRA HIGH rings. If the customer does not have lens cov- Time to switch to the lapping rod.

This is more than enough to hold the scope through hard recoil. ers, leave room for covers so they can be put on at a later date.

Installing Rings How the rings are installed goes along way in determining how the scope will perform. A sloppy job will never allow the best performance from the scope. Mount the lower half of the rings on the bases. If using turn-in rings, lightly grease the ring where it makes contact with the base before turning in.

With the rear windage adjustable base, tighten the screws to hold the rings. Then measure the top of the screw to the base with a caliper and center. Most Leopold bases will read 0.210" on both sides. With the Weaver-style bases, tighten the crossbolt to 30 inch-pounds. Put aside the screws that came with the rings and use a spare set of screws. That way you will not ding up the original screws and leave a bad looking screw head. I keep a set of working screws just for scope mounting, both base and rings.

Install the top halves of the rings and mount the scope alignment rods in them. Torque down the screws as if mounting the scope. Check the points to see how far off the rings are from being inline. With Weaver-style rings that have no windage adjustment, rotating one or both rings 180 degrees may bring

the points in closer. Worst case, this may require a different set of rings if the issue is not caused by the bases being off center.

The scope alignment rod points do not have to perfectly aligned but the closer they are now, the less work later. Do not be tempted to use an alignment rod to tweak the rings to line them up. The twisting caused by doing this affects the bases and the rings and both will try to go back to original positions. With the rings in close alignment, mount a 1" aluminum tube in the rings and do a bore sight to the tube. For initial bore sighting, I use the side of a building 20 yards away for a reference.

I align the bore to the edge of the building and then look through the 1" tube. This should be close to centered in the tube. If not, move the windage over and realign the rings to bring this into center. Torque the windage screws to 45 inch-pounds. You could also use a laser bore sight to do the same thing.

SCOPE MOUNTING FOR ACCURACY CONTINUED

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Now is the time to lap the rings for good contact with the scope tube. Mark the inside center edge of the rings, top and bottom, with a punch mark. Not heavy, just enough to see the dimple. I had to highlight the dimples with permanent marker to see them. This provides a witness mark and will let you know the location and orientation of the ring halves. While not necessary, I use a scope ring reamer to make the job quicker. Install the reamer in the rings and lightly tighten down.

Keep the gap on the rings even throughout the entire lapping. Do not turn the reamer the wrong way in steel rings as it will damage it. I once had to send one in for sharpening after not paying attention and making this mistake. Turn the reamer a full turn and tighten the one screw in each ring in across pattern, only enough to tighten for drag on the reamer. Do this five times or so. Disassemble the rings and remove the reamer; there should have been some material removed by the reamer.

Note, the reamer may be removing more on one side as the rings are not perfectly aligned and therefore needs to remove where needed most. Ream until there is approximately 50% contact. Once the reamer is removing material and leaves about 50% contact in the second ring, it's time to change to the lapping rod. Switch to using a ring lapping tool or start here if you do not have a reamer. Start with 280 grit lapping compound and put some on the top and bottom halves of the rings.

Put the lap in the rings and mount and tighten enough to cause drag as the lap is moved back and forth. This will feel gritty as it laps. Use a figure eight pattern and lap in the rings. Far Tighten the screw in across pattern and keep the gap even on both sides. When the lap moves easily, tighten 1/16 of a turn and continue. I run ten tighten cycles and then take the lap out and clean up the lap and the rings. Check to see

how much material has been removed. Continue until there is around 60% to 70% contact.

Switch to 320 grit lapping compound and continue to 80% to 90% contact. This is more than enough to hold the scope and going to 100% runs the risk of going too far and losing the gap between the rings. If this does happen, use a piece of 280 to 320 grit sandpaper on a flat surface and evenly remove material on the flats of the top halves. There was a customer of mine that brought in his newly-mounted scope. He had lapped the rings to 100% contact and lost the gap to hold the scope firmly.

I told him to be back in a half hour and it would be fixed. I removed less than a 1/16" from both the top and bottom halves to restore the gap. Touched up with some Aluma-Hyde and a happy customer was out the door. Mounting the Scope Clean up the rings, especially the screws holes and remove all the lapping compound. Use a scope

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308 Winchester Mauser rifle. level tool to level the scope. With the preparation done to the bases, the need to use the gun as a level should have been taken care off. Place a level across the lower ring and level the gun in the vise. Use the barrel level to match the level on the base. Using the new screws, mount the scope in the rings and leave the rings loose enough to turn the scope by hand. If the caps on the scope are flat, use them to level the scope.

Otherwise, take the cap off and use the elevation screw as a flat surface. Set the eye relief for the scope and then level it to the level on the barrel. Gently tighten the screws in a crisscross pattern while checking to make sure the scope doesn't rotate. Tighten the ring screws to 28 inch-pounds for the Leopold. Most steel rings are 20 inchpounds while aluminum is 15 inch-pounds. The manufacturer should have a torque specifications in their instructions. Again, use blue thread lock if desired.

I double check the scope level with a plumb bob hanging on a far wall. With the gun level on the barrel level, the string of the plumb bob should be parallel with the vertical crosshair. If it is off, check the level of the ring to the barrel level. More than likely, the barrel level has slipped. Verify that the objective bell does not touch the barrel. If there are scope covers, put these on to check clearance. If the gun is a bolt action, check that the bolt has clearance to the ocular bell.

On semi-autos, put in a full mag of dummy rounds and quickly cycle the action to make sure the cases will clear the scope. You don't

want to have an upset customer come back with simple issues you could have caught in the shop. Bore Sighting With my first gun, I slammed on the scope, went out to a "range", and tried sighting it in. I wasted a lot of ammo, not to say I didn't have fun shooting, but it would have been better if it was on the paper to begin with.

The old school method of pulling the bolt out and sighting through the bore on a distant object and adjusting the scope is no longer cost effective. A bore sight makes the job easier and quicker, along with being able to sight in guns that you can't see through the bore due to the action. There are several methods of bore sighting, including using a collimator, cartridge-shaped lasers that chamber like ammunition, and a laser sight with adapters for the bore.

The collimator setup is only good for low-medium rings and is not adjustable for height. I also do not like putting the steel bore arbors into a barrel and find the spring clip does not always hold it steady while adjusting the scope. If you only bore sight a few calibers/cartridges, cartridge-shaped lasers work well. I do too many different calibers and chamberings to even try to buy these and then store all of them. Plus there is always that odd one that comes into the shop that they do not make a laser for.

With that said, I prefer a laser bore sight that has O-rings on it for different calibers. The O-ring will not scratch the barrel and stays put once inserted into the barrel and up to its tapered cone; this also always centers it in the bore. The only problem I have with using this is that bright days make it

difficult to see the red laser dot. Since I do not have a large shop, I have to sight through a window into a storage container used to store wood for the winter.

Pointing it into the shade of the container, I can see the dot on the back wall. Carrying one of these on a hunt can also verify you are still on target if you know where the dot ends up after sighting in. A green laser is supposed to be better in day light to see but I have not popped for the cost of one of those yet. There is a 25-foot target that comes with the laser bore sight kit. Since I do not have a clear 25 feet in the shop to put up this target, I have to go outside and use my container.

Put the laser dot on the target and then adjust the crosshairs to match the target. Sighting In Now the fun begins. While no one shoots the same as another, it is good practice to make sure the gun is printing on paper. I start at 25 yards to make sure I'm definitely on the target. I want to be high and centered. Then I move out to 100 yards. Drop a shot on the target and without moving the gun, move the crosshairs to the hole. Fire a few more for effect and you should be able to wrap up the project.

When I hand over a newly-mounted scope on a gun to a customer, I have them check the eye relief and make any adjustments at that time. Use a piece of painter's tape on the ring and scope tube to mark level before moving. Adjust eye relief and re-torque. Stress that they still need to sight in the gun to match their ammunition and how they shoot. I also give them the final target, but keep a picture for my records. AG

HISTORY

Accurizing Savage Model 112s

Selection of a non-custom rifle for serious target shooting can be a most difficult choice as inherent quality must be there or all may be for naught. Savage Model 112 rifles challenge the best of them.

BY NORMAN E. JOHNSON MARCH 2020

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A variety of rifle models have been important in my accuracy and research work for well over a half century. I've worked with more than a score of Model 40X Remingtons alone and in a wide variety of calibers with most bedded into original factory wood stocks. They have been a benchmark in my work. In the interim I have also used and tested other available rifle models chambered in a variety of factory, modified, and wildcat cartridges as well as several of my own design.

But for unknown reasons it took much longer for me to recognize the merits of the Savage bolt action rifles, particularly the older Model 112 single-shot series. This prompted me to add the older Savage 112 to my switch-barrel rifles. These fine old single-actions, made from 1975-1979, would demonstrate, along with a few changes, accuracy potential equal to my other rifles. These medium-length single-shot actions were produced by Savage Arms circa 1975-1979.

With some precision bedding work the Savage Model 112 medium-length action will deliver most excellent accuracy, including a number of the Model 40X rifles. Though I could have gone to custom stocks in these older Savage Model 112 rifles, I chose to use the existing solid walnut stocks. They were Every square inch of stock bedding surface is utilized where metal meets wood.

The advantage of a central bedding screw is apparent here. Most durable and would bed down well with their solid cylindrical single-shot actions. They didn't have the easier-to-shoot, flat stock forend, but I could live with this. I did, however, stiffen the forends as I will cover later in this article. So this treatise will deal with the gunsmithing and accuracy evaluation of these older Savage Models 112 medium-length actions used as switch-barrel rifles.

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The stock hole provides a perfect tapping guide. A brass escutcheon is added later. Unlike most other actions, the forward guard-screw hole is used for the rear action screw, placing this screw forward of the trigger assembly. The rear screw is a wood screw used only to hold the trigger guard. Receiver Bedding I already had the newer Model 12 Savage and also had another older Model 112 long action Savage. I eventually added extra bolts to all four actions for a most versatile Savage switch-barrel series.

This would eventually include around a dozen barrels chambered to a good variety of cartridges used in target work and testing at my range just outside my gunsmithing shop. In a well thought out approach to developing true accuracy from these single-shot actions, nothing would be left to guesswork in the bedding department as the interfacing between metal and wood became one.

Some rifles adapt to accuracy bedding more readily than others and the Savage Model 112 medium length single-shot action posed no extraordinary challenges, particularly with the original wood stocks. Close observation of the older medium length Model 112 Savage action reveals a cylindrical section of steel 1.350 inches in diameter with a total length of 8.75 inches from the

front of the receiver ring to the rear tang. The action is drawn down by two major bedding screws with 1/4-28 threads.

The front screw enters the bottom of the receiver about an inch from the front of the receiver ring. Immediately forward of the receiver ring is the recoil lug sandwiched between the barrel lock-ring and the receiver, similar to the 40X Remington. But this is where the action screw function differs between the two. The Model 40X Remington rear action screw draws the tang down into the stock bedding at this juncture for a functional two-point bedding.

Though the rear tang bedding surface is virtually identical on the Savage Model 112 and the Model 40X Remington, the rear action screw placement on the Savage Model 112 is much more forward. It enters up through the front trigger guard screw hole immediately ahead of the forward aspect of the trigger mechanism, leaving the two action screws 4.490 inches apart at centers, whereas the action screw centers are 7 1/2 inches on the 40X Remington.

As a heavy, free-floating target barrel is interfaced to any action, regardless of receiver screw placement or receiver rigidity, there is a finite measurable amount of springing within the action, albeit very small. Thus, in my overall evaluation of the Model 112

action bedding, I considered a logical way to improve things here, and this was accomplished.

The approach was to fully bed the action from the rear tang through the receiver ring and recoil lug, leaving clearance at all points of the recoil lug except the rear bearing surface. On one of them I would install a metal bedding pillar at the existing rear screw where the front trigger guard screw enters. Further, I would install a central action screw with a solid stock escutcheon between the two existing action screws on both rifles.

Then, in lieu of a two-point bedding system, the result was a totally bedded receiver with three draw down screws. I had used the central action screw in conjunction with the Score High Gunsmithing (Score-Hi.com, Bedding Pillars on some of my Model 40X Remingtons with a measurably improved outcome, so this worthwhile bedding improvement wasn't an untested process, and it should work out on the Savage walnut stocks as well. Proper Bedding Procedure Our approach to proper stock-to-action fit must be well thought out.

There must be no springing of the action in the stock as the bedding screws are alternately loosened and tightened. This is often felt by sensitive finger contact between stock

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Wood chips are seen at the sides of each stock. and action. Even minor vertical group stringing or double groups can be a telltale sign of poor bedding. Proper bedding can largely prevent this, and we don't correct it by placing shims or washers between wood and metal as is sometimes done. The surface must be cleaned up where metal meets wood to ensure a perfect bonding for the bedding material.

I carefully mask any areas of wood I don't want bedding material by placing electrical tape on all surfaces of the recoil lug, leaving only the rear surface of it to contact the stock mortise. This produces the necessary freedom between the recoil lug and stock after the tape is removed. The action is then coated with release agent to prevent bonding to the stock as the action is placed in position. I also coat the recoil lug and guard screws with release agent.

Holes and indentations on the action should be filled with clay or the like before applying release agent. I always use the best bedding material I can get and the best I've found is Brownells Steel Bed. It has less than 1/10th

of one percent shrinkage and sets up very hard with stainless steel in the mixture. It doesn't run and has ample working time to complete the job. Before placing Steel Bed into the stock I place the stock horizontally in a padded vise with the buttstock supported.

You'll need to have access below the stock to guide and turn the action screws in place after lowering the action squarely into its bed. I also place a shim between the bottom of the barrel and forend channel to keep the barrel and action in line during the bedding operation. The action is then lowered squarely into the stock as it pushed down into the bedding material. Keep things as evenly as possible and start the rear tang screw first while holding the barrel.

Then, with both screws started, draw them down evenly, but not too firmly. You should notice some oozing of bedding material at the tang and along the sides of the stock, which is then cleaned up. The bedding material should set while the barrel is suspended horizontally, just as you would shoot it. Any small amount of midreceiver action springing

or bending will become part of the bedding process as the barrel tends to cause an infinitesimal amount of central action flexing.

I rarely wait until the bedding is steel-hard to remove the action from the stock. Once it is set firmly, after about three hours at room temperature or warmer, the action can be removed from the stock. It cleans up easier at this time too. Then, following clean-up, place the action back in the stock and tighten the action screw moderately firm. Leave the release agent wherever it ends up at first inspection and remove this later.

Savage M112 Forend Rails While utilizing the Savage Model 112 factory walnut stock, I added an element of rigidity to the forend. This was helpful in achieving accuracy from this fine rifle. The pictures show pretty much what I did here. I put the stock in the milling machine and bonded-in a length of 1/2-inch steel from the recoil lug forward to within a couple inches of the forend tip. Of course, I used Steel Bed to accomplish this. Pressure tests later demonstrated a

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Far Shown here are 100 and 300-yard groups made with the 30BR cartridge using a 1:17 twist Shilen match select barrel. Groups in the quarter-minute range are very encouraging using Sierra 135 grain and Berger 135 grain bullets. 243 Winchester 1:8 twist Douglas select grade barrel. The 300-yard group measured under 0.600 inch (0.002 MOA) using 107 grain Sierra Match King bullets.

The same 107 Sierra Match King bullets produced quite regular quarter-minute 100 yard groups. more rigid forend, which is always helpful while bench shooting. It is also helpful when shooting the lighter style stocks from a bench rest, particularly with a heavy barrel, and helps steady the rifle while making those longer shots. The stock was plenty strong through the pistol grip that has a nice bulge in the palm area reminiscent of a Wundhammer Swell. Both are an aid to benchrest shooting.

Central Action Screw Though the addition of a central action screw or central pillar may have its critics, my own experience bears out the benefits of these added supports. I have used them on a number of single-shot actions, including the 40X Remingtons and now three Savage Model

112s. When properly installed they most definitely will improve action-to-stock stability and rifle accuracy. As you approach the quarter-minute level of accuracy you'll note a difference. Here is how to do it right.

I always install the central pillar or action screw as a separate procedure following a good, solid bedding job. In no case will these be installed as a stop-gap or means of trying to remedy already poor bedding. The central action screw is essentially there to help minimize action springing or flexing and to further unite metal-to-wood as a solid, integral unit. The addition of a central action screw and escutcheon is basically a simple gunsmithing procedure.

Most of the work is performed with the barreled action upside down in the stock while held squarely in a padded milling/drilling vise. They are medium-length action, single-shot rifles precision bedded into the original walnut stocks. The rifle on the left has a Shilen 1:17 twist barrel chambered for the 30BR and is equipped with a Sightron SIII SS8-32x56 scope. The rifle on the right has a Douglas 1:8 twist barrel chambered for the .243 Winchester.

It is equipped with a 6-24X Bausch & Lomb Elite scope and Talley bases and rings. The target performance of these switch-barrel rifles would rival most custom built rifles. With everything square, a through-hole is drilled midway between the existing action screws directly through the stock and on through the cartridge ramp inside the action. This lead hole is made with a number 3 drill size for a size 1/4-28 thread tap.

The Savage receiver is not case-hardened so tapping will be easy but I do recommend a quality tap. The stock hole is then enlarged to a 1/4 inch down to the action as it serves as a perfect tapping guide. The thread is conveniently tapped with everything still in place. Next, the escutcheon hole in the gunstock is formed using a clean-cutting end mill to correct depth. Everything is totally in-line for a perfectly square screw draw down.

I make a brass escutcheon to fit an Allen head socket screw to match the other action screws. I finally enlarge the stock screw hole to 17/64 inch to (Continued on page 23)

ACCURIZING SAVAGE MODEL 112S CONTINUED

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avoid screw contact with wood. I then bond the escutcheon in position and clean up the holes for a neat job. It's all done perfectly in line. As the work is proof tested, there will be no springing of the action as the new center screw is torqued down. All three action screws should be alternately tightened, resulting in a most solid bedding of the entire receiver. Testing the Work I have always placed high regard on the "Three B's" of accuracy in rifle evaluation: Bedding, Barrel, and Bullet.

Though dozens of other elements enter into the accuracy equation, I always look first to the three B's as each compliment the other. As I approach the sub-half minute level into quarter minute accuracy with non-custom rifles, it isn't always how much I gain but that which I don't lose that matters as well.

As I worked with these two older Savage Models 112 singleshoot rifles, I knew I was on the right track as inherent accuracy was quite comparable to that being delivered by my Model 40X Remington rifles and some others. I had to work a little harder to attain such levels of accuracy with some rifles but it became readily apparent as I worked with the Savages. I had fitted 12 barrels to the four Model 112 and 12 actions. All of these Savage actions have two bolts for a wide chambering selection.

One of the two 112s covered in this treatise was chambered for one of the three experimental 30BR cartridges I was working on with a 1:17 twist Shilen select match barrel. The other was chambered for a standard .243 Winchester special 1:8 twist Douglas premium barrel. I'll include here a series of targets shot with these two Savage 112 single-shot rifles in the varying stages of load workup.

I had no trouble at all shooting sub-halfminute groups mixed with many quarter-minute groups using the Shilen 30BR chambering with its 1:17 twist match select barrel. Several groups measured well under an inch for five shots at 300 yards. This is outstanding performance in any rifle where the barrel, bullet, and bedding must flawlessly come together. The Savage chambered for the special 1:8 twist with a Douglas barrel was also a performer.

Here too, a variety of bullets and components came through—quarter-minute groups were quite regular and groups under an inch at 300 yards were common. Though there are sundry things that comprise the makeup of a well shooting rifle, accuracy evaluation is incomplete where all things are not closely observed. With close access to a shooting range, it was a gunsmithing fulfillment to see these fine old Savage rifles perform with the best of them. AG

RIFLES

Savage Trigger Guard Screw Fix

The rear trigger guard screw on the Savage Model 112 is poorly supported and often strips out, along with a chunk of walnut base wood that goes with it. Here's how to make a permanent fix.

BY NORMAN E. JOHNSON MARCH 2020

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Unlike most other bolt rifles, where the rear trigger guard screw serves to draw the action snugly into the bedding, the Model 112 Savage does not. Ordinarily, the rear Fillister head screw need not be taken out to remove the Model 112 action from the stock; but it usually is, and the hole wears out—sometimes breaking a chunk of wood with it. To remedy the problem, the space surrounding the screw hole can be enlarged and anew threaded base and screw installed to solidly anchor the trigger guard.

In the process I enlarged and squared off the damaged area of the stock surrounding the old screw hole. I opened and squared off the socket to fit a piece of aluminum about a half inch cubed. I used a small chisel and a Dremel tool to form the space for the aluminum block. The block was formed to closely fit the stock. The stock is bedded with Brownells Steel Bed back to the receiver tang.

Unlike most other bolt action receivers, there is no hole in the stock for the receiver tang which normally passes through the rear hole of the trigger guard. The Savage

Model 112 has a wood screw here. The picture shows the addition of a central pillar bedding screw hole used for maximum receiver stability. hole, allowing some space for bonding material at contact surfaces. A 10-32, 82-degree screw head is used to attach the trigger guard to the new aluminum block.

As away to position the screw hole, the aluminum block is placed in the stock and the trigger guard is set in position over it. A pencil or scribe is then used to mark exactly where the threaded screw hole must be located right through the guard screw hole. Having drilled and tapped the screw hole, the aluminum block is attached squarely to the rear of the trigger guard and set into position to test for correct fit.

If it fits well, carefully apply a light coat of release agent to the surfaces of the trigger guard, being careful none gets on the aluminum block. We don't want to bond the trigger guard into the stock.

SAVAGE TRIGGER GUARD SCREW FIX CONTINUED

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American Gunsmith Writer Search We are always in need of articles and are interested in working with gunsmiths that want to write for us. Write up that great gun- The aluminum block is now ready to permanently bond into position. Here I chose to use J-B

Kwik Weld, a fast setting version smithing project for us and turn your idea into cash! of J-B Weld which begins to set up in less than 10 minutes. Brownells Steel Bed is also a good choice.

As the threaded block is bonding into position, the action was set into the stock and the guard screws tightened down to assure a positive fit. With the aluminum block bonded solidly in place, the trigger guard was removed and things Far

looked good. Little, if any, cleanup was necessary. Though it may appear an overly involved process just to re-set a guard screw, there are few short cuts in doing a job right. Much like deciding just what to do with a tooth in need of dental work... either fill it, install a crown, pull it, or do nothing. This job was less painful! AG Savage Model 112 trigger guard solidly in place with a standard 1/4 inch guard screw front and a threaded replacement screw into the aluminum block below.

Far From top, front 1/4-inch screw below the recoil lug; added 1/4-inch central action screw with escutcheon; rear standard 1/4-inch action screw through the front trigger guard hole; and replacement trigger guard screw at rear of the trigger guard threaded into the aluminum block.

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FINISHING

Reader Forum

BY AMERICAN GUNSMITH EDITORS MARCH 2020

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Remington 552 My favorite .22 rifle is the Remington 552 and I enjoyed the December 2019 article about it. Several years ago a friend gave me an old, rusted 552. I sanded, buffed, polished, and reblued it into a somewhat-nice looking rifle that is really fun to shoot. Paul Because of the excessive play between the barrel and receiver, a receiver-mounted scope is of no use, so I just shoot with open sights. But there's one problem: the chamber seems to be "crudged up" and there are failures to extract.

I disassembled the rifle exactly per Ed Nutter's instructions. I soaked, scrubbed, and cleaned everything. Inspecting the extractor revealed it to be not worn with good spring tension. Even with a brushed out the chamber there are still have some failures to extract, just not as many. Should I ream out the chamber, rather like the gas piston on an M14? Given the expense of a tool I'll only use once, would another tool (drill bit?) suffice to clean out whatever is clogging the chamber?

John Author Ed Nutter responds. You mention "excessive play" between the barrel and receiver. I'd look into that as it could cause failures to extract. Does the brass stay in the chamber? Does the ejector slip off the rim? As always, be consistent with ammunition choice to

rule that out. There are some bulk .22 Long Rifle that's best used in revolvers because they seem underpowered and have trouble cycling a semi-auto.

Also, check if a previous owner shot large amounts of .22 Short, eroding the chamber and causing .22 LR to stick. Ruger Shotgun Repair The spur on the left hammer of my Ruger Gold Label broke off. Ruger won't sell me the hammer so I sent them the shotgun for replacement. Later, the same hammer spur broke off and I sent it back to Ruger. They called telling me they don't repair these and have no parts. Any idea how I can fix this and find parts? Charlie Get a free copy of Brownells Parts Source List.

Plenty of sources there besides Jack First and the former Numrich. During your contact with Brownells speak with one of their techs for the phone or address of a really good shotgun gunsmith with a wad of welding experience. Follow up that lead to communicate with the recommended 'smith. Make your best deal and ship the gun. We were more than mildly shocked at the news Ruger doesn't make shotguns anymore but, sadly, they no longer list them as currently manufactured.

While likely still available for retailers, it means supplies of the Red Label will soon dry up. The Red Label is one of the best O/U scatterguns ever for the MSRP asked. AG

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