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SAVAGE B-MAG MAINTENANCE

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ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 138

DIGITAL ARCHIVE EDITION

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PISTOLS

Glocksmith Course

BY AMERICAN GUNSMITH EDITORS JUNE 2015

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American Gunsmithing Institute has a new DVD-based course on Glocks, teaching students how to modify the popular pistols in a variety of custom options. The series contains more than 17 hours of re-mastered video instruction and comes with a complete set of class notes with close ups and lists of sources. All the DVDs are indexed to help the user quickly find the information they are looking for.

The course contains complete disassembly and re-assembly, the Glock Armorer's Course, Volumes 1 and 2 of Building the Custom Glock, and bonus footage of recorded live classroom sessions with gunsmith Gene Shuey. The total disassembly and reassembly of the Glock pistol can be intimidating and Ken Brooks walks through every step down to the very last part in close-up detail.

Robert Dunlap then uses a rare original factory cutaway pistol to reveal the intricate inner workings of the pistol's design applicable to all models of the Glock. T. R. Graham goes into greater depth, demonstrating all types of trigger modifications available by switching parts, using aftermarket parts, and by modifying factory originals. He also reviews many sight options, detailing the differences between competition and combatstyle sights.

Glock sights, barrels, frames, and triggers can be improved by anyone with the right training and basic skills. Gene Shuey has been working on Glock pistols for many years, studying, experimenting, and testing different approaches to enhancing the gun. Mr. Shuey

has developed a simple step-by-step system for customizations that you can use for your customers. He selects an aftermarket "drop-in" barrel, installs it, and then demonstrates how to test for proper fit and polish the chamber for reliable feeding.

Grip and frame improvements are covered, as well as thumb safety installation. Mr. Shuey takes a Caspian slide and demonstrates how to machine in a sight track, as well as bevel the side and front edges for a striking appearance and smooth, concealed carry.

Advanced and comprehensive trigger jobs that speeds up lock time with Titanium firing pins and the Cominoli "1911 style" thumb safety are covered, as are the pros and cons of an extensive assortment of slide stops and magazine releases available as both factory and aftermarket parts.

Shuey also demonstrates re-contouring the shape of the pistol's grip and enhancing the surface texture, offering his approach to making a reusable, model-specific template to ensure a perfect job every time, as well as different sight options and the advantages and disadvantages of each. He also demonstrates methods and tools used to install sights without damaging custom slides. On top of all that, he covers finishing options such as hard chrome, DLC, and bluing.

The course wraps with live classroom footage with Gene Shuey on professional trigger jobs with existing parts. The course includes formal testing, and a certificate of completion and patch for those passing the on-line test. Contact americangunsmith.com or for details.

MAINTENANCE & REPAIR

Savage B-Mag Maintenance

It might not be the first but it won't be the last made to chamber the Winchester Super Magnum rimfire.

BY CHICK BLOOD JUNE 2015

ORIGINAL PP. 3-7

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It's possible I missed them, but I didn't see rack after rack of rifles chambered for the exciting new and heavily reported upon Winchester Super Magnum (WSM) rimfire at the 2015 SHOT Show. Maybe that's really not a first. If I'd been attending the first SHOT Show to follow Elmer Keith's development of the .357 and .44 Magnum cartridges the same might have been said of wheel guns.

Once the dynamics of the immortal Elmer's new rounds had created arising public demand for revolvers to discharge them, a little grass was allowed grow beneath the feet at Ruger and Smith & Wesson to design, develop, and bring forth revolvers capable of delivering the promised performance of both magnums. I did not attend the SHOT SHOW at which those subsequent offerings appeared initially. Judging by SHOT 2015, they are still going strong.

While that brief history of a cartridge preceding a firearm is true enough, what follows illustrates a reversal in which case a prototype rifle played a significant role preceding the cartridge by suggesting anew caliber. The story begins when I was attending a Ruger Armorer's Training Program session back in the 1980s. A firm knock at the door interrupted the instructor. When he opened it, there stood William Bannerman Ruger holding a stocked rifle with a heavy barrel.

Apologizing for the interruption, he asked to show the class the rifle and stepped into the room. Displaying the small size of the bore hole centered in the oneinch OD barrel he announced to all present that small hole had the potential of housing and discharging 17 WSM cartridge.

In recent years I can recall no other new round receiving as much printer's ink as the .17 WSM. the best rimfire caliber ever made. "So far," he continued, "I haven't been able to convince any (expletives deleted) ammunition manufacturer to make it!" After thanking us for listening, William B. Ruger left the room carrying what most of those present believed to have been a prototype of a rifle chambered for .17 caliber. As they say, time passed. The persistent "Mr.

B."eventually convinced Steve Hornady, well established producer of ammunition and other gun-related products, to become involved. Inputs from Marlin R&D, a powder maker, and a team of Ruger/ Hornady engineers were formed and maintained. The result went public as the .17 HMR (Hornady Magnum Rimfire.) Since then, some industry wags have often referred to the round as the .17 Hornady/Marlin/Ruger.

The current onslaught of gun writer ink devoted to performance praise of the Winchester Super Magnum has had little to

do with inspiring the .17 Wunderpill. The idea got started at Winchester. Partially due to their legendary rimfire successes, Savage was contacted to develop a platform for the WSM. A team of engineers from both companies worked together through thousands of rounds to design anew rifle around anew cartridge. A major concern arose among the Winchester people.

The rim of their cartridge was quite heavier than other rimfires. As you have noticed, most rimfire rounds get touched off by a rectangular-shaped firing pin, leaving a similar indent in the rim. Wouldn't the thicker rim of the WSM present increased resistance to a rectangular hit that frequent misfires would result? Take a look at tip of the B-Mag hammer. It is round, not rectangular, at its impact point. After the design was proven by extensive test firing all concerns were eliminated.

The B- Mag and .17 WSM became a near instant success with its eagerly awaiting shooting public. There remained one problem. The rifles did not rest long in dealer inventories and the same scarcity crushing all .22 caliber ammo sales was the doing the same with .17 WSM food. Hoarding of all rimfire ammo and retail price gouging of what was available were the major contributors to the initial

SAVAGE B-MAG MAINTENANCE CONTINUED

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Always depress the bolt release on the side of the receiver to extract the bolt completely. It's quicker, shortage, which only intensified due to public dread of future ammunition restrictions being considered. Among these proposed "gun control" measures was the totally impractical laser micro-engraving of numbers on bullets. But that cockamamie idea has yet to become reality.

One significant reason is engraving numbers on any bullet would have to be so shallow that those numbers would be rubbed into illegible gibberish during a single trip down a rifled barrel. There is some good news. I was assured by more than one major ammo maker that the small caliber market is being leveled out. Rimfire is now coming off production lines in millions-per-day batches. Availability of the .17 WSM isn't totally out of the woods yet but has measurably improved.

There's no way I can see either Winchester or Savage allowing their collective creations to vanish and predict along life for both. I further predict zero longevity for varmints out to 200 yards. All the aforementioned gun writer ink expended about the Winchester Super Magnum makes it unnecessary for me to repeat its performance data here verbatim.

In the unlikely possibility that ink has escaped your study, direct your browser to "Winchester ammunition" and seek out "Winchester .17 Super Magnum." Take your pick of data sheets and articles written in high praise, print them out and gorge. Among your customers, however, there will eventually arrive one bearing a B-Mag. To date, the rifle has never benefited from media coverage to equal that of the WSM. Never mind, as a gunsmith, what you need to know about the Savage B-Mag you're about to discover here.

The former adjusting screw, which had a couple of indents into which the tool fit, has been replaced by a spring loaded wheel (A). The trigger guard pops up and taken off toward the front sight in preparation for stock removal. A A Closer Look I've always felt Savage and Ruger do a better job with their manuals than any other firearm manufacturer. With that praise having been given, I recommend you get ahead of the game.

Call Savage and request their manual covering the B-Mag, Mark I, Rascal, Mark II, and Model 93 rifles. Further, I recommend studying the sections dedicated to the B-Mag, which the owner of the rifle is never likely to do. I said study and there are several items you should commit to memory. Among those you'll notice right off is the tang safety of the B-Mag. When B

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it is positioned fully to the rear, the trigger is blocked and the bolt can be opened. This is exactly how the action should be maintained when the rifle is being loaded. Most new-in-box rifles arrive these days without their bolts installed in the action. The B-Mag arrives likewise. There's only one way to install it. Before doing so, check the four digits on the bolt. They must match the last four digits of the rifle's serial number. If not, make no attempt to install the bolt.

Instead, call Savage, tell them what's up, and they'll let you know immediately what must be done. A mismatch of serial numbers demands Push the pin to the rear and remove the extractor. Cover the front of the bolt when

you remove the tool. The extractor spring is still inside. A that particular B-Mag should never have that bolt installed, let alone be fired with it installed. Let's return to more positive things. The serial numbers match up.

With no ammunition in the rifle because the eight or ten round rotary magazine (owner's choice) has been removed, position the bolt handle to 11 o'clock. Align the bolt release slot on the bolt with the bolt release in the receiver. Insert the bolt. Press the release inward. Push the bolt forward. Rotate the bolt handle down and let up on the release. Cycle the bolt a few times to make sure the release is keeping it within the receiver.



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The head and hammer area single unit. Dreamer that I am, I'm going to assume that the owner has checked the serial numbers, installed the bolt, checked the bolt release function, and handed over the B-Mag with the barreled action in the stock. To hell and risking a shot off toe with assuming. You place the safety ON, open the bolt, check the chamber, the numbers, and remove the magazine. Place one hand under the rotary magazine.

With your free hand, depress the magazine latch and eject the unit downward into your waiting hand. Leave the bolt open. Invert the rifle. Insert a flat blade screwdriver into the slot. Gently push inward while pushing downward on the retaining tab. When you have applied enough pressure the trigger guard will pop up from the stock. Grasp the guard and remove it forward, You are still looking downward into the stock. There are two screws securing the action to the stock. Loosen both with a 5/32" Allen wrench.

These screws are captive in the bedding pillars. Once the screws are loose enough to release the receiver there's no need to back them out further and there's no sense trying. Look for the Accu Trigger adjustment screw. I did an entire article on the trigger in the

December 2004 issue. When I wrote that piece a special tool for the Accu Trigger came with the rifle. It was a knurled knob attached to a small OD tube with its end notched and fit inside the housing to either lighten or heavy up the trigger pull.

There is no such tool accompanying the B-Mag. I discovered the reason after a closer examination of the trigger assembly housing. There, under the extension at the rear of the trigger is what the manual kept referring to as a screw. It has no head or slots like a screw, but is round like a wheel. It revolves to the right or left like a wheel with scalloped wedges all around it and you won't need any tool to adjust the trigger. To lighten, lift upward on the spring and rotate it clockwise.

To increase the pull, lift and turn counter clockwise. Range of pull weight runs from 2.5 to 4 pounds. The spring must not be turned beyond these trigger pull limits. Check the pull after each adjustment. In another respect the Accu Trigger hasn't changed. No replacement parts whatsoever are available but a request for an entire Accu Trigger assembly for any Savage rifle originally equipped with it will be filled as promptly as possible.

Beyond The Owner's Manual In the case of a B-Mag, going beyond means disassembly of the bolt. You'll be working on it from its rear to its front. I suggest you place each part removed adjacent to its presence in the drawing. After disassembly, you should end up with a 3D approximation of the drawing. Let's begin building said 3D image. Back out the bolt cap retaining screw (7) and pull off the bolt handle cap (16). Reach for the snap ring pliers. Apply them to and remove the retaining ring (14).

It is possible you will find an irregular painted spot on the rear of the bolt. Leave it alone. It's the mark placed there by the factory assembler of the bolt. Examine the cocking pin (4). It resembles a small dumbbell but one end of the pin has a larger diameter than its opposite end. Now examine the cam lock. Notice how the cut out in the lock resembles a figure eight. It's larger at one end than on the other, just like the cocking pin.

When you compress the cam lock initially the larger end of the figure eight cut will surround the larger end of the cocking pin. Push down on the pin to remove it. In this disassembly the sear pin (5) could be pushed out as soon as the hammer is removed. In reassembly, after the rear assembly is holding together enough pressure must be placed on the cam lock to center the sear pin hole in the bolt body cut before the pin is installed.

My recommendation is to allow the sear pin to remain in the hammer until the time comes to rejoin the front and rear bolt assemblies. Doing so gave the rear assembly an assist at holding together until the actual mating takes place but does/did not eliminate the application of pressure on the cam lock to align the pin in the bolt cut. Right about now you have an option to consider.

You can postpone the assembly reunion, simply dump all components of the rear assembly onto a magnetized disassembly pad and move on to the front bolt assembly. If that be your preference, insert the tip of a dental or other small tool between the rear of the extractor (6) and the dowel pin (15). Push the dowel pin to the rear. Simultaneous with the push, get a hold on the extractor. Perhaps you haven't noticed just yet but the extractor seats inside the recess at the back end of the extractor cut in the bolt.

Wiggling the seated part will unseat it, You have to be defensive now. An unthinking removal of the extractor will release its spring and the dowel pin to escape to a place only to be discovered after along, tiring, wearying hunt. Either set an escape-proof trap for the two potential fugitives or take a proven, effective, world-wide tranquilizer before setting off on the search.

I was just wondering, do you suppose it will ever come to be that the .17 Winchester Super Magnum will ever be nicknamed the .17 Winchester Savage Magnum? Despite the initials being the same... no way. AG



Savage B-Mag (Specifications may change without notice) 504 Scope base 506 Scope base screws 529 Swivel studs 555 Action screws 556 Stock pillars 10 Magazine assembly 12C Bolt handle 12CA Bolt handle cap 12CB Bolt handle cap screw 18 Stock assembly 19A Trigger guard 68 Front magazine mount 68A Front magazine mount e-dip 13 HAMMER 2 PC FIRING PIN 14 RETAINING RING 5/8" BOWED 15 DOWEL PIN 16



BOLT HANDLE CAP 17 BOLT HANDLE, RH 7
RETAINING SCREW 8 FIRING PIN RETURN SPRING
9 BOLT HANDLE RETAINING PIN 10 MAIN SPRING
11 EXTRACTOR SPRING 12 FIRING PIN 2 PC 1
109691-17 WSM 2 BOLT, CAM LOCK, RH 3 MAIN
SPRING RETAINER 4 COCKING PIN 5 SEAR PIN 6
EXTRACTOR

MAINTENANCE & REPAIR

Diagnosing Hunting Rifle Accuracy, Part Two

Part one gave examples of customer expectations when bringing their rifle in with accuracy problems. Here's how to further help.

BY WENDELL DEANER JUNE 2015

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Given a customer rifle, let's take some specifics to determine how to proceed in different situations. I know that many of you have different ways of doing things. I am going to present some of the tips and techniques that have helped me over the years in my quest for accurate rifles. Feel free to disagree but no death threats please. For a new rifle that won't shoot anything well, tighten everything—all stock screws, scope mounts, and rings. Make sure the scope is mounted correctly.

Check the barrel and crown with a bore scope for any factory flaws. If nothing looks overtly amiss, I stop here for now. Hopefully your customer will have brought targets as proof of his claims. Ask him about ammunition used and if he used a benchrest. This one from Brownells (080-000-515) is high quality. Remember inch-pounds, not foot-pounds. Inch groups are still hard to come by for most shooters

with virgin factory rifles and ammunition. This could be more the shooter's fault than the rifle.

I have some representative groups from stock rifles to show my customer to determine if they are about the same as his. If his gun is really shooting poorly, send it back to the manufacturer with the targets. If the gun is sent back to the customer with no explanation and shoots no better, ask your customer if they want to go further before starting accurizing. With used just-bought rifles I perform the same checks before continuing standard procedures to enhance accuracy.

Rifles can be thought of as several systems brought together to form a whole. I like to break down my projects into separate components (action, barrel, stock, trigger, and sighting system) that together yield a good shooting rifle. For the action, check the contact of the bolt lugs in their seats. Many

factory rifles will have contact with one lug (assuming two lugs) and very little or no contact with the other lug.

Lapping the lugs is the answer, but this may create excess headspace requiring the barrel be set back and rechambered, a serious expense and not to be taken casually. If bolt misalignment is really egregious it should be done, but I have rifles that aren't perfect in this regard that shoot well. Blueprinting and truing the action is another big step that, although it certainly can help, is probably overkill in trying to get a factory rifle to shoot better.

For 7mm-.30 caliber rifles, a goal of about 1-1.5" three-shot groups at one hundred yards is good enough for that rifle's intended purpose. Some of them might shoot better, but I'm happy with consistent groups in that range. Yes, five or ten-shot groups area better indicator of a rifle's real

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35 Whelen Remington CDL. At least it is round and not “stringing.” This rifle will do better but don’t let your customers expect one MOA groups without some tweaking. This is what it should look like. accuracy potential, but I am talking hunting rifles here. The barrel may be the most important part of this equation. A bad barrel will not shoot anything well. A good barrel will shoot everything at least adequately and some loads very well.

Most factory barrels are in between these extremes, but some can really surprise us. I’m not going to pick on any brand because all of them have the potential to shoot great groups. I had a rifle that was known as a generally accurate brand but gave me a fit. I used bullets that were also regarded accurate but couldn’t get this gun to live up to its poten-

tial. I glass bedded the wooden stock, free-floated the barrel, lapped the scope rings, and to pillar bedded it.

I could have hunted with this rifle, being accurate enough for that, but I wanted more. I did bore scope the barrel early on and wasn’t impressed. Chatter marks were all over it, but scoping many other barrels from this same manufacturer revealed the same flaws and some of them were highly accurate. I tried several bullets and found one respected as accurate and highly regarded as an excellent hunting bullet. It gives good, consistent, round groups that I can be satisfied with.

I still feel that this rifle needs anew barrel, but several deer have fallen to it without any problems using the new bullet combination, so what the heck? Barrels are funny things.

Some look like they should shoot like a house afire and usually do, but some won’t. Some look like crap but still manage. Since they must be cleaned from the muzzle, damage to the crown is a strong possibility. All can shoot well. to produce adequate accuracy. If your customer is adamant, maybe anew, custom barrel is in order.

Just be sure to mention the cost up front. Some will ask why I haven’t mentioned the crown as a main culprit in our dilemma. That’s because if I look at the crown under magnification and can’t see any obvious flaws, it isn’t. A minor flaw in the crown will usually cause unexplained fliers and may contribute to a larger group, but won’t usually cause overly-large groups. Cut anew one if you feel like it but don’t expect much benefit unless you are

DIAGNOSING HUNTING RIFLE ACCURACY, PART TWO CONTINUED

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I put a lot of pressure on this one. It was OK, correcting severe damage. I look at the crown first and last, but I always do check it. There is no question that a really screwed-up crown will defeat our purpose, but let's keep this part of the equation in perspective. I once owned a rifle with four inches of rifling missing about halfway down the barrel. Guess what? It didn't shoot very well. If you find something like this return your gun to the factory.

They usually will stand behind obvious problems in manufacture. Now for the stock. If your rifle doesn't have a good base it doesn't matter if your barreled action is perfect or not, it still won't shoot to its potential. By the same token, if your barrel is a stinker all

the glass bedding in the world won't do much good. If your customer's rifle has a wood stock look for glazed areas along the barrel channel that indicate where the barrel is touching the stock.

If there are some, this barrel may benefit from free-floating. Some 'smiths still advocate fully bedding the barrel in epoxy for best accuracy. I am not going to dispute this but I think each rifle will let you know which is best. The old trick of using some business cards to try a pressure point at the end of the barrel to soften barrel harmonics could reveal a fix. Many factory stocks, both synthetic and wood, come with a pressure point in this area.

I don't hold myself smarter Polyurethane products can seal a basketball court against Lebron James. Good enough for me. Instead of adjusting the original I recommend replacing it. than the boys that created this rifle. If the gun shoots OK I don't mess with it, but if I'm not satisfied I free-float the barrel. You can always put it back. There is a consensus among many, but not an absolute agreement, that free floating is best for top accuracy. This includes synthetic as well as wood stocks.

However, there is free floating and not really floating. Some synthetic stocks have a serious gap in the area between the barrel channel and barrel. Old-time 'smiths prided

DIAGNOSING HUNTING RIFLE ACCURACY, PART TWO CONTINUED

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It is acceptable for a hunting rifle, not necessarily for precision shooting. Manufacturers will usually stand behind their products. This is one of the first things to check if a trusted rifle suddenly goes bad. themselves in bedding this area very closely and precisely. Even today I read reviews of rifles that extol the maker's ability to keep the stock line gap almost nonexistent. Take one of these guns and squeeze the barrel and tip of the stock together.

Most likely the synthetic stock will bend enough to touch the barrel and wood stocks can do the same. If this is the case, how can the barrel not be expected to slap into the stock when it is fired and vibrating like a rattler's tail? If free floating, hog out the barrel

channel well and use some tape wrapped around the barrel when you bed it to get it up and away from the stock. This must be done with aesthetics in mind but there is a fragile balance that can be achieved with care.

Bedding the action can be done by only addressing the area around the recoil lug (many factories now do this with some kind of sticky goo) or including the rear tang and the whole action. I don't like the stuff they are putting in there. If it's my rifle I pull it out. I am not second guessing the manufacturers, I just have the time and inclination to do the bedding myself. I usually bed the tang and recoil lug including about two inches of barrel, free floating the rest.

If I am not bedding the entire action I like a little clearance in that area. This has worked well for me on wood stocks.

Some synthetic No matter what some folks may have told you, small groups are easier to come using higher magnification than 4X. stocks will not hold any epoxy and there is very little you can do with them except try to get a good fit and make sure the barrel is really free floated (although most have a pressure point installed at the factory.) Many of the ones I've seen lately from the factories have the sticky bedding in the recoil area. It might be best to leave it alone.

It depends on the particular rifle of course. Try the manufacturer's version first before modifying the stock.

DIAGNOSING HUNTING RIFLE ACCURACY, PART TWO CONTINUED

ORIGINAL PAGE 12

One other factor to consider when your customer is shooting off a benchrest to try and make little holes is if the stock actually fits him. A guy who is getting pounded from every shot cannot shoot good groups. I went to my range one day for maintenance at the 200 yard bench and met up with a fellow trying to sight in a .300 Winchester Magnum with 190 grain factory loads. He had just bought the gun. For the caliber it was a relatively light rifle.

My shoulder started to hurt watching this guy struggle with the recoil. Why he was trying to sight in at that distance I don't know but he confided this was the first time he had shot it. He never did get close to shooting a group and was highly dissatisfied. I've had rifles and shotguns that weren't stocked well for me that I couldn't shoot without getting slammed in the cheek. I sold the ones that I didn't restock.

No one can shoot well when anticipating a smack in the face from a prize fighter every time they pull the trigger. This could be a real problem which your customer doesn't want or doesn't think to talk about. Most men don't want to come crying that his gun kicks the hell out of him. Many will just tough it out. Women are usually smarter. A good stock fit, a decent recoil pad, maybe a muzzle brake, or maybe a step down in caliber will do wonders.

We aren't psychologists, but these types of problems can be worked out if we look for them. When dealing with a wooden stock I recommend sealing all spots unprotected by stock finish with polyurethane products. After you've hogged out the barrel channel, coat it well and let it sink in. Another coat won't hurt. Don't forget the buttstock under the recoil pad and perhaps inside the action mortise.

Although I'm not sure that anything can totally stop a wood stock from warping, this step can help to keep your accuracy improvement efforts viable. How about the trigger? Most of the factory triggers are a lot better than the lawyer-heavy ones of

just a few years ago. It appears that the ambulance chasers haven't figured out away to bamboozle a jury when it comes to such products as the Savage Accu Trigger and similar units from other makers.

All of these triggers are good and welcome and don't need any introduction by me. All of them are user adjustable and can be brought to a great pull without too much trouble. However, there are still plenty of rifles out there with the older style triggers attached. We used to adjust them as a matter of course. Nowadays, I hesitate because of legal liability. If you suspect that a trigger is giving your customer problems with his accuracy shooting I recommend installing anew one.

Timney, Jewell, Rifle Basix, and others have triggers for almost any rifle, are relatively inexpensive, easy to adjust, and come with clear instructions. They should make your customer happy and will take some of the heat off you. Here's my favorite problem: The old reliable rifle that has suddenly went sour. You and your customer know this rifle is supposed to shoot. It's your job to figure out why it won't. Again, check for tight screws. This is probably the most common cause for a gun to start acting up.

This is about the same as those trouble shooting guides you get with appliances (Is there is gas in your mower? Is the dryer plugged in?) I look at the scope critically even if it's been mounted for awhile. You will see streaks of finish scraped off if it moved in the mounts. An easy fix is to lap the rings and maybe apply a little rosin. Be aware, if a heavy scope is mounted on a big kicker something could me amiss.

Heavy recoil plus high scope weight is an indication of potential trouble, especially with the current trend of using the highest magnification scope possible. Does your customer have a "scope cut?" Something is wrong with his bench shooting technique or there is a bad or mismatched scope

mounting. There are easy fixes for this, but look at the rifle and the shooter as well. I like to use the analogy of the mechanic who takes your car in for service to change your windshield wipers.

When you get it back you find that your brakes don't work. "Well, you didn't ask me to fix that." Try to go a little beyond that kind of thinking. Your customer will appreciate it. Don't discount the notion of a scope, even a high dollar special, going bad. Usually if a scope holds up through a hundred rounds or so it should be OK, but bad things happen to good scopes. This can be checked by running the scope through its paces on a collimator and by mounting a proven scope to compare.

Scopes that have a problem should be returned to the manufacturer with targets of before and after to prove your point. They usually repair or replace a bad scope without any hassle. Sighting systems are important for small groups. I have a Model 94 Winchester .30-30 with peep sights and can shoot better groups than with the traditional buckhorn sights, at least off the bench. That isn't to say that factory sights would cost me a deer in the woods.

A trainload of venison taken with traditional sights is a pretty good argument that they work. What about lever actions and pumps? What can you do with rifles that wear two-piece stocks and clean from the front of the barrel? Take things as a whole. Evaluate the shooter, the targets, and the gun. A vague, "This thing won't shoot," doesn't tell us much, although there are techniques we all have where we can start the process to make sure this type of a gun can shoot to its potential.

Start by checking if anything is loose and for any obvious problems. These guns can definitely have a problem at the crown and further down the barrel due to cleaning rod wear. If the crown can be repaired all is well and good, but if the barrel is damaged

there's not much you can do except replace it or maybe shorten it to remove the offending area. Now is the time to discuss bore guides with your guy. Some of these guns shoot very well, but your customer's expectations may be unrealistic. I always use three-shot groups with these types of rifles and score them for hunting accuracy using factory ammunition. Scope mounting is just as important as with any other rifle. If a guy comes in with a 6-24X scope mounted on a .30-30 I've immediately got my doubts.

But, winning hearts and minds when your customer has his mind made up can be whimsical at times. One thing I do agree with is that although good groups are possible with a 4X scope at 100 yards, it's easier to shoot one with a 3-9X set on nine power. I have a little Ruger lever action I'm fond of that wears a Weaver 1- 3X variable. I use a lot of cheap paper plates as targets marking my aiming points with abroad ink pen. When Complete your American Gunsmith collection. Or read up on a special subject!

A LIMITED NUMBER OF THE FOLLOWING

ORIGINAL SOURCE PAGE

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FROM THE ARCHIVE

Does Size Really Matter?

Let's look at the issues of size and scale when it comes to building miniaturized guns and ammunition.

BY JASON ALBEE JUNE 2015

ORIGINAL PP. 14-16

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Our society is obsessed with all things big. Many people want a larger truck or bigger gun. Children want bigger toys. Competition drives people to make things larger. The arms race between the Soviet Union and the United States culminated in the largest nuclear bomb ever detonated: The Tsar Bomb. Competition can also drive things to go small. A great example of this is the miniaturization of computers. Every year engineers find ways to squeeze more and more circuits onto a chip.

They are used in everything from our cars to toys that children play with. Even in the world of toys, things are competitive. Children like to mimic what their parents do. Many toys are made to look like adult things. Back in the eighties, the Easy Bake Oven was more than a toy oven as it could bake a small cake. Most doll houses at least have working doors.

Now imagine a fully functional doll house where the water ran, the stove got hot, the refrigerator was cold, tiny books with pages

that turned, the radio received stations, and the television set worked. Now a doll house like this would entice the boys to play with as well. Boys have some toys that do function as their big world counterparts, such as remote control vehicles. Adults also like to play too. Many times they'll have even bigger playthings.

Some adult playthings are smaller versions of things but they're called souvenirs and collectibles instead of toys. Souvenirs are mentioned in the bible. At the Greek Temple of Artemis, silver smiths made smaller statue versions of the Goddess Artemis, which visitors took home just as people do today. Guns and bullets are a good example of something that people can shrink to a much smaller size.

The size of a gun does reach a functional limit, not because they can't go any smaller but because human hands just can't pull the trigger anymore. A projectile size can go down to the level of an atom and still be functional. The power of a projectile is dependent on its velocity and weight. By in-

creasing the speed of the projectile a person increases the projectile's destructive power or how far it will penetrate into a substance. A smaller bullet can have the same force as a larger bullet.

Particle accelerators are similar to guns and shoot projectiles, but at speeds near the speed of light. A lot of resistance is needed to decelerate particles but sometimes they have so much force they will cut right through an object and keep going. In 1978 Russian scientist Anatoli Petrovich Bugorski stuck his head into a particle accelerator and the proton beam ripped through his head near the speed of light. The safety mechanisms should not have allowed that.

The particles burned a tiny hole through the front of his head emerging through the back. He survived the ordeal with his mental faculties intact and completed

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his Ph. D., although the right side of his face was paralyzed and he suffered partial hearing loss. There are problems with using a particle accelerator as a firearm. They are so large, and some are miles long. There is no way a person is going fit one on their belt. Scaling down small electromagnetic weapons has many engineering challenges, such as a power source. The US Department of Defense is working on large, high speed projectile weapons using electromagnetic energy.

They are similar to particle accelerators in that they both use electromagnetic energy to push a projectile instead of explosive gas. One example of this is a coil gun. The advantages of using such weapons are the potential projectile speeds of over five thousand miles per hour. It also reduces the entire overall size of the projectile, which would be ideal for tiny projectiles and doesn't require a shell containing explosives. Hand held version of this only exist in the minds of science fiction writers and fans.

This only leaves us the standard firearms that can be shrunk. Conventional guns can be squeezed to a much smaller size that can be used as a collectible. There is a whole other world within the firearms production that is devoted to small firearms.

One such part of this world are various miniature arms makers and collectors, such as the Miniature Arms Society (minia-

turearms.com), Miniature Arms Collectors and Makers Society, Ltd. (waynedriskillminiatures.com), and various makers listed at the Miniature Engineering Craftsmanship Museum (craftsmanshipmuseum.com/Miniarms.htm). These groups are made of a wide array of individuals. Some make guns full time while others do it for a hobby.

One such individual is Michel Lefaivre, who does it for the pleasure of doing it. Michel lives in Paris, France and he has been retired for over ten years. Michel only does gun making as a hobby but is a master gunsmith nonetheless. He won the silver medal from the NRA for a pair of pistols in 2005 among many other awards. He spends hundreds to thousands of hours creating each masterpiece, using a variety of tools such as clock maker tools, dental tools, and others he has made himself.

All his miniature guns are the scale reproduction of the full-scale models, including all their tiniest details. They are fully functional and can fire. The smallest bullets he has made are 2.7mm caliber cartridges, but the primers are blanks and the powder was missing for safety reasons only.

He usually makes 1/3 or 2/5 scale models and believes that it is not too realistic to go below 1/3 scale for proper machining, mechanical functioning, clear engravings, stock or grip checkerings while still being visible with the naked eye to see all the tiny

details that make the gun looking nice. While he has never personally taken any gun or bullet to the microscopic level, there are some artists that have and it is the sort of work for watchmakers or their equal.

He says any gun made in miniature has its own specific difficulties. For example, a bolt action rifle, like a Mauser K98 is much more complex than a flintlock rifle or pistol. Art, finish, and external presentation takes more time than for flintlocks, whilst semi-automatic pistols or rifles require much more mechanical operations, like milling, lathing, drilling, and boring have stringent, precision tolerances.

Manufacturing drawings are more complex with all scale dimensions, if you want the mini to function correctly. At many instances, parts have to be rejected and made again until fully at tolerances. Michel has not yet used a three dimensional printer or miniature remote control tools in the creation of his masterpieces, working instead with conventional tooling and machining such as precision milling machine, lathe, drillers, and usually making his own cutting tools, mills, cutters, drills.

All his miniatures are unique and not a series. He gets his tools in several specialized precision

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mechanical tool shops and suppliers in Paris where he lives. To date, his favorite miniature firearms include a 1/3 scale blunderbuss flintlock gun given to Napoleon, a 2/5 scale pair of flintlock dueling pistols from the Manufacture of Versailles, a 2/5 scale Navy Luger from the WWI German Imperial Navy, and a 1/3-scale WWII German Mauser K98 carbine. He chose to make them because he feels they are mythical, well known, beautiful weapons that were difficult and complicated to make.

All these mini guns had their own difficulties to make, mainly because of the small scale. To be fully functional, they include difficult machining operations, requiring special handmade cutting tools or rifling jigs. As an example, for the 1/3 scale 98K Mauser the bolt receiver was the most difficult part to make as it included the internal helicoidal machining for locking the bolt action. Checkering the walnut stocks at scale is also very difficult, requires trials on blank pieces and special training as well.

Before starting a project, he tries to discover and anticipate which part will be the most difficult to make. He establishes all the manufacturing drawings with cross sections for each of the parts, including dimensions at the scale with mechanical tolerances for perfect functioning. Computers are probably the best known example of miniaturization. One single chip today has over a billion transistors. Jet engines that

are no bigger than your thumb also exist, so the only limit to gun size is the tools to make them.

One of the tools today that is used to make guns is the 3D printer. There has been a lot of hype around using a three dimensional printer to print a gun but their usefulness in making miniatures has limits too. Like normal printers and TVs, pixel quality is probably the limiting factor in the miniaturization of objects with 3D printers.

Now the complexity of the object, which a person could print, is dependent upon the materials used. 3D printers are great at creating objects made from the same material all the way through but there is a big difference in printing a wrench and printing a fully functional television set. Currently, 3D printers don't have the ability to do that, although there has been progress. It has become possible to make microscopic batteries with a 3D printer.

There are quite a few materials that go into a battery, such as an electrolyte (the thing that holds the charge), a positive and negative terminal, and the parts that electricity/electrons pass through. Not all 3D printers are created equal. Some are designed to create microscopic objects. There are even 3D printers that can make things at the nanoscale, which is much smaller than the width of a human hair.

Scientists can even create cages for bacteria, so the technology is there to create a myriad of microscopic things. Another tool that could be helpful is remote controlled robots. People have used remote control vehicles for decades. They allow the user to control the motions of a vehicle through manipulation of the remote. Doctors have used remote control machines to do surgery from the brain to the feet and everything in between.

NASA has sent robot rovers all over the solar system and beyond while controlling their movements from Earth. The technical know-how to use remote control machines in the creation of parts, the assembly of small firearms, and their accessories is feasible, but the desire to create them and have fun is questionable. Every year millions of people are drawn to car races. In ancient Rome, thousands of spectators enjoyed watching gladiators battle it out. Competition is the heart and soul of all sports.

Every year, Robot Battles (robotbattles.com) and other organizations put on multiple competitions where robots either battle it out or race. Now imagine such a competition between microscopic tanks that could take place every year. It might not attract as many people as car racing but it could be fun and exciting. The tools to make miniaturized guns will only increase as the years pass. With the right tools, and the right artisan, such could be a reality for all. AG

FINISHING

Tool Tuning

What could be more important to a gunsmith than his tools? Here's how to maximize their use and service life.

BY PAUL MAZAN JUNE 2015

ORIGINAL PP. 17-20

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From the high dollar lathe, milling machine, and bluing set up of a large shop, to the screwdrivers, punches, and bench vise of the hobbyist, tools are at the heart and soul of every gunsmith. Despite this, I find many folks just don't know how to take care of their tools and why it is so important. I caught my 40-year-old son sawing back and forth with a file and realized that nobody really teaches us how to use and maintain even seeming-simple tools.

Let's take a look at some of the basic tools of the trade and see if we can find a few things you don't know but should. Screwdrivers are among the most basic and important hand tool of the trade. Many people will judge the quality of your work by first looking at the condition of the screws in the These Brownells bits are mounted in Special Tool & Chisel Handles (#249-640-642AK) to make turn screws. I prefer them for close, precise work and made them up in my shop.

File handles area must to keep the user safe from injury. The file on the right came with an integral handle. guns you have worked on. The typical screwdriver found at a

"cheap Chinese tool store" has a keystone tip that tapers along all four axis of its length. These screwdrivers are responsible for more buggered screw slots than any other. Because the blade tapers to fit any number of screw slot sizes it only contacts the metal at the top edge of the slot.

When you put pressure on the screw the first thing that happens is the metal at the top edge of the slot deforms. The more pressure, the more deformity. Good gunsmithing demands a parallel ground blade fitting snugly into the slot and the same width as the screw head. With parallel sides the pressure of installing or removing a screw is transferred to the entire interior face of the slot uniformly. This allows far more pressure with no damage to the slot itself.

Grace USA (graceusatools.com) makes a set of gunsmith screwdrivers that appear to have keystone tips but closer inspection reveals the very ends have been milled to present a parallel section inside the screw slot. Brownells and Wheeler Engineering offer sets with up to 85 bits to fit the most commonly found gun screw slots. Brownells goes a step farther offering Thin-

Bit sets for the super skinny screw slots found on many high dollar guns. They are well worth the investment and will save you a world of trouble.

You will also find that the tips of the best bits are made to break rather than bend when they reach their torque limit. It may be upsetting when a bit breaks but the alternative is for the bit to bend and cam itself out of the slot, damaging the slot on its journey to pop out of the slot and dig into the surrounding metal or wood. A good bit is engineered to break so it won't ruin a stock or scratch the metal of the gun. Brownells has always offered free replacement of broken bits.

If you over torque the bit and it breaks, send it back and they will replace it free. If you find yourself with a tool box full of standard commercial screwdrivers the tips can be ground on a stone to the correct profile in just a few minutes. Brownells offers the Magna-Tip Bit Shaping Stone so you can use your drill press to grind any screwdriver to precisely fit any screw. There is just no excuse for buggered screw slots in our trade. Files are simple tool that are often misused. For

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The typical hammer (right) has grinding marks that can be transferred to the work piece. The polished peen reflects the image of the photographer, the care its owner takes with his customer's firearms, and the pride he takes in his work. safety's sake, please put a handle on every one of your files. In the heat of along bout at the bench it is easy to run the tang of the file into your hand. The handle also gives you better control of the file and that is important when working in tight places.

Far too many people seem to think files are indestructible; they are not. Depending on how you use and care for them, a good file can last a lifetime, or be irretrievably ruined the first time you use it. Protect files from coming in contact with others. Either hang your files on a rack so they do not touch each other or make cardboard sleeves for each one

before storing. Cut only on the forward stroke, not back-and-forth like a saw. Files remove metal with microscopic burrs located on the edge of the teeth.

When you push the file forward those burrs scratch the surface of the metal and remove small pieces of it. Drawing the file back while maintaining downward pressure, those burrs are bent into the valley between the teeth. On the next forward stroke they take off less material until the burrs are removed completely or break off from being bent back and forth, leaving a file that does not cut.

Use chalk (yes, the same stuff used on a blackboard) to prevent, or at least reduce, the build up of file shavings in between the teeth of the file that causes it to stop cutting and increases scratches on the surface of the work, known as pinning. Chalks helps stop sharp little metal chips from getting into the

teeth, requiring less time with a file card cleaning out the chips, allows the file to cut just as aggressively, and gives the work a smoother finish.

Standard chalk works fine or buy it in oneinch diameter sticks from Brownells (#080-705-006AK.) Finally, clean the chips out of the teeth after each use or whenever needed with a file card. Take care of your files and perhaps you can be like a friend of mine that has used his for twenty-five years without having to replace them. In the case of hammers my advice is simple. Any hammer that will come in contact with a gun should have its face polished to perfect smoothness.

Crazy perhaps, but ev- Far Left neglected, it will mushroom and get worse with use. A rounded edge can slip off the work, making the job harder and risking damage.

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every nick or scratch on the surface of the hammer face will be transferred to whatever it strikes with any force. Those little areas will have to be polished out before you finish the project. Isn't it easier if there are no marks to polish out? Yes, this is picky and extreme but it is also part of a mindset. Approach every job as if yours won't reverse you can grind the serrations off so as not to stamp a "trade-mark" on your customer's guns.

Rubber wedge door stops (not pictured) can be used to help hold tapered stocks. Brass or lead jaws are better for holding metal parts securely without marring them. If each detail is important and your work will improve. If you ever present your work to one of the custom gunsmith guilds for judgment you'll re-

alize this level of detail no longer seems silly. In the gunsmith shop there is rarely a need for a really heavy hammer.

Heavy hammers move more metal faster but we are normally moving small amounts of metal in a precise manner. A four to six ounce ball peen hammer is all you need for the majority of gunsmithing jobs. A hammer should feel comfortable in the hand and the head should go where you want it to. If you're having trouble hitting the head of a punch Far I'd call that abuse but I'm the guy that did it and should know better. What is it good for now? I could put it in my tackle box for removing fish hooks.

It sure doesn't belong in my shop unless I carefully regrind the entire tip so the jaws meet perfectly straight. From left to right,

needle nose, parallel jaw, and duckbill. Buy good pliers that align correctly, keep them away from high heat (welding, brazing, soldering, etc.) and take good care of them. squarely or the hammer just feels like it is out of control don't be afraid to try shortening the handle or modifying the grip.

I know gunsmiths that make their own hammers because they feel their design idea does a particular job better. There is nothing like a tool you have designed and made yourself to give you pride and satisfaction in a job done well. There are more different types of punches than you can shake a stick at and I have tried to collect a set of every one of them over the years. Long, short, pointed, or flat, they all need to be kept in good shape to do the job

TOOL TUNING CONTINUED

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you bought them to do. Probably the most abused punch in the shop is the pin punch. We use them to remove pins, poke into tight corners and hidden places, move sights, open paint cans, pick our nose, and peen rivets. OK, I exaggerate... slightly. Punches have two business ends. One is struck by a hammer and the other transfers force to an object, usually a pin we are trying to remove. Both ends are subject to being mashed and the small end is also subject to being dinged, broken, or bent.

Both ends should be inspected regularly and repaired when they need it. I have never been successful in trying to straightening a bent punch so as to again slip through a hole cleanly when driving out a pin. When a punch bends or breaks I write its size down so I can order a replacement, cut it off above the bend, dress it off, and use it as a starter punch. A battered tip is larger in diameter than it is supposed to be and should also be dressed back to original diameter and polished.

The same goes for the striking surface. Clean it up, square it off, and polish it smooth. The points on your center punches should be sharp and centered. A center punch that has been inadvertently used on hardened steel will have its tip flattened, making it difficult to precisely locate the center point next time it is used. Dress the tip and you'll find it much easier to precisely locate the exact point to mark. Every bench I've ever looked at has had a wide selection of pliers.

The most common are needle nose, parallel jaw, and duckbill, with more lengths of needle nose than any other kind. A good set of pliers is like an extension of your hand with tiny little tips that can pluck debris out of places your fat fingers could never reach. A good set of gunsmithing pliers should never leave the shop and visit the garage where plier-destroying disaster lurks around every corner.

If abused the tips on those delicate needle nose pliers no longer come together when closed and has an "S" bend in it. The par-

allel jaws aren't after trying to hold on to a nut, leaving the jaws anything but smooth. If so damaged, assess if they can be fixed. Sometimes a little careful work can realign the needle nose tips or resquare the parallel jaws with careful filing and polishing and save replacing a potentially expensive tool. About all I used to care about drill bits was that I had the size I needed.

Once I had completed the set up, turned on the drill press, and started to try to make a hole, I began caring very much that the dang drill bit was sharp. I hate it when they smoke and squeal but won't cut. Most often that will happen on a popular size I use often, so I usually have several more bits available. I'm not going to sell you a drill bit sharpener. Unless you are working in a large, high-production machine shop, bits are too inexpensive to ever buy a machine to resharpen them.

I solved this with a Titanium nitride coated high speed tool steel set of 115 bits purchased for \$55. This set has every fractional, letter, and number size bit in it. As such a set isn't the best quality of bits, I replace the often-used bits individually as needed from Brownells. Only a quarter of bits in my set are replacements because I rarely need the oddball sizes, but the day I need one I already have it and it will be good for at least a few holes before it needs replacing.

This also keeps all the bits in one box nicely labeled and sorted. That saves a lot of time I used to waste trying to find the right size bit. We will end our trip around the shop with a look at your bench vise. I think I have seen more guns ruined with a poorly prepared vise than any other tool. This isn't the easily replaced damage like a buggered screw head that can generally be repolished and a wider slot cut.

No, this is caused by serrated teeth on the vise jaws and an operator who either thinks nobody will notice that fancy work on the metal, doesn't care, or never took the time to figure out away to avoid it. Most vises come with a set of jaws that are

something other than smooth. The serrations help plumbers hold pipes and other parts that will be hidden behind a wall or under a toilet. Unless your customer or you keep your guns under that toilet, people will notice.

Most jaws are removable and the serrations can be milled, ground, filed off and polished smooth. For more delicate parts, a set of soft jaws made of lead, plastic, wood, brass, or any other material softer than steel. They should slip easily on and off the vise. I suggest having several for different jobs. For reworking screw heads I like jaws made of soft wood. I can tighten the vise around the screw threads and hold the screw while I work on it without damaging the threads.

To drift sights dovetailed into the slide or barrel, brass or lead jaws hold the work firmly without marring the steel. That vise is your third hand and you'll use it a lot. Don't let it mark your customer's gun. Specialty vises secure barrels without digging into the metal. Action wrenches will hold the action without damaging it.

For your own sake don't let people know that you worked on a gun because they recognize the tooth pattern of your vise and/or the pipe wrench you used on every barrel you have ever changed. I promise, that kind of calling card won't bring you more work. This is by no means a complete list but covers some of the more commonly used hand tools and the problems that can be ignored. Good tools help to turn out good work and make the job easier. Keeping them in good condition is a mindset important to the gunsmith.

Every customer showing a gun you worked on displays the quality of your work. The results will determine if you will get his next job or if he goes elsewhere looking for better quality workmanship. That quality starts with your tools. AG

PEOPLE & COMPANIES

Remington 700 Triggers

Trigger adjustment, improvement, and safety checks for a classic rifle.

BY ROBERT K. CAMPBELL JUNE 2015

ORIGINAL PP. 21-22

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Original caption: Top: The classic and popular Remington 700. also important and I conduct this before and after any work. The Remington 700 rifle lends itself well to trigger adjustment as the safety does not ride on the bolt. While the Mauser system has merit, Remington's modifications allow a simpler rifle.

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The Remington 700 is among the best modern sporting rifles. Offered by Remington in many different variations since 1962 and available at the major sporting chains, the Remington 700 is an accurate, reliable, good looking rifle. Just the same, you will see quite a few in the shop. During the previous year I worked with two rifles that were improved by careful trigger adjustment and such good results are the norm.

While hard practice and attention to detail are the primary details in marksmanship, a good crisp and controllable trigger is an aid to the trained shooter. Trigger pull weight depends upon the individual. Some are capable of managing a light trigger well, finding 3.5 pound triggers useful. I'd never go below this for a sporting gun. A custom trigger is the answer for those willing and able to master a

lighter trigger, but that is suited for target and varmint rifles and beyond our scope here.

Before beginning to work with the trigger I always take a trigger compression reading. While some use weights and that is good, I use either a Lyman or RCBS trigger pull gauge. A safety function check is All in a day's work.

To adjust the trigger, clear and disassemble the rifle by removing the action and trigger guard screws holding the action and stock together and the box magazine from the receiver. The magazine will interfere with your leverage in adjusting the trigger screws. Place the barreled action in a padded vice. Two adjustment screws are part of the trigger assembly and located toward the barrel end of the receiver. The upper unit adjusts over travel.

It should normally be left at the factory setting in a rifle intended for field use. The lower screw adjust trigger pull/compression weight. At the end of the action near the bottom of the trigger assembly is a screw controlling sear engagement. This screw is factory set and should never be adjusted. The screws are set with a thin coat of paint or a type of shrink wrapped plastic from the factory depending upon the generation of the rifle. A previous adjustment would be a dead giveaway.

Usually the settings are resealed with some type of light paint. Nail polish works well. To adjust the trigger, clean the paint or plastic away from the screws. During this operation I open the bolt but do not remove it. There is no set rule for where to begin adjusting the trigger screw but I think a quarter turn is a good place. Adjust and recheck the weight until the trigger breaks at just under four

REMINGTON 700 TRIGGERS CONTINUED

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They are not the same. Above center: The Remington action is compact, simple, and reliable. pounds or so. Reassemble, recheck the weight, and do the safety check again. When certain the adjustment is complete, I disassemble, reseal the screws with light paint, and reassemble the rifle. Over travel adjustment is possible but I don't recommend this in afield gun. A hunting rifle used against dangerous game should never have the factory over travel adjustment reset.

A precision rifle for institutional use is in the same critical category. A benchrest or varmint rifle is another matter. To adjust the over travel, rotate the screw one complete Below center: This Remington features slot head screws, though I've heard of hex head screws in the Remington. This may be factory sealant. turn. The striker will not fall when

the trigger is pressed. Recock the action and try again. Turn the screw while pressing the trigger.

At about a half turn of the trigger adjustment screw the trigger should break the sear. If the trigger repeatedly breaks cleanly at this point, turn the trigger over travel screw about one quarter turn counter clockwise. This should be the perfect adjustment, yielding the cleanest possible break with a factory trigger. Remember the tension of pull weight increases as the screw is turned in and lightened as the screw is backed out. Safety Check Rack the bolt and be certain the rifle cocks properly.

Dry fire the rifle with both the trigger compression gauge and the finger. Rack the bolt with the safety on. Press and release the trig-

ger to be certain the safety works properly. The striker should not release. Repeat the test several times to be certain the safety works. If the striker releases during this test, back out the sear engagement screw another quarter turn and repeat the test. With the safety off work the bolt forcefully and bring it to a hard stop. This is a test of sear engagement.

The striker should not release. The final test is to rack the bolt and place the safety lever in the safe position and then press the trigger. The striker must not release. The Remington 700 rifle has reached classic status and remains a personal favorite. These instructions will allow a good crisp trigger press without the need for an aftermarket trigger for most common uses. AG

PEOPLE & COMPANIES

Reader Forum

BY AMERICAN GUNSMITH EDITORS JUNE 2015

ORIGINAL PP. 23-24

Letter From Brownells I just had the pleasure of reading “AR Upper Quick Fixes: Match Bolt Carriers” by Joe Carlos in the May 2014 issue of American Gunsmith. I want you to know how much I appreciate you mentioning our staking tool. Very kind of you! Really interesting to read about your work. Your experience with ARs certainly goes back and your article is proof of your great expertise.

Your mention of harmonics and how different carriers, lube, and bullet seating with affect accuracy are truly noteworthy, something I’ve heard of but never known a whole lot about until now. Nicely done! My sincere thanks again, Joe. Please let us know how we can help with future articles and projects. Frank R. Brownell Author Joe Carlos responds. Thanks for the letter. It is nice to know someone is reading and appreciating! Reader Forum Comments Some comments from the April 2015 issue.

First, the Ithaca 37 typically has weak magazine springs. Some people shuck a pump gun almost before the shot gets out of the muzzle. When this happens recoil pushes the last shotshell in the magazine forward, the action opens, the shell stop retracts, the carrier comes up, the weak spring recovers from recoil, and the shell goes out on the ground. The cure is to replace the magazine spring with a stronger one. I use A5 Browning springs to fix this. Second, the Winchester 1400.

The instructions for replacing the magazine throat is accurate provided you can find a replacement throat. Winchester/Browning no longer supplies these parts and 1200 parts won’t fit. I am not aware of anyone offering these parts anymore. Does anyone on your staff know

of a source for these one or two piece throats (they are different)? I could machine anew one out of aluminum or brass but the cost would exceed the value of the gun. Finally, Remington/Sako extractor replacement.

Remington 721 and 722 rifles used a snap-in extractor that Remington hasn’t supplied for many years. The riveted type won’t work and the current snap-in type is dimensioned differently so it won’t work either. The Sako-type conversion is the only option left. Norman K. Weaver Weaver’s Gun Shop Thanks for the comments, To your question, Numrich Gun Parts Corporation (gunpartscorp.com) lists 1400 throats. Also check Jack First.

Brownells doesn’t show 1400 parts but does provide a free list of parts sources upon request. We believe you’ll find Buckinghams in Trenton, TN on that list and their emphasis is on Winchester. Brownells.com Letter From Ten-Ring Sure enjoyed the May 2015 issue. The editorial on hammer forged barrels was excellent and I got a real chuckle out of the guy with the Browning Auto-5. Ideal with men who take their guns apart or mess with the actions on a daily basis.

When they get to the part where they have to put them back together, panic sets in and my telephone rings. The most common call is for the Ruger Mark II pistol. Alex B. Hamilton Ten-Ring Precision, Inc. Dave Sengelaub of Sunnen Products Company wrote that editorial and was gracious enough to send it in. We try to help gunsmiths avoid the type of messes you point out and imagine that serving as the American Pistolsmiths Guild President, Secretary, and Pistolsmith of the Year you’ve fixed plenty!

Switch Barrel Article I finally had the time and inclination to read “A Second Bolt And Barrel For Bolt Actions” by Norman Johnson in the February 2015 issue. I noticed a mistake on page nine, first column, first complete sentence, stating, “In this case the barrel shoulder would need to be set back or the chamber lengthened...” Lengthening the chamber would make the issue of excess headspace due to shorter bolt worse. Jim Corolewski Bloomfield, MO Author Norman Johnson responds.

Jim, you are absolutely right in pointing out my incorrect use of the word “lengthened” when I meant “shortened.” This is obvious and I should have noticed it. Hope you otherwise enjoyed the article. Recoil Pad Installation On Synthetic Gunstocks I want to thank you for doing the article “Recoil Pad Installation On Synthetic Gunstocks” in the April 2015 issue. That article was great. It help me to understand the process and what was needed to complete it.

Can you also make one about how to install scope rings on hardened rifle receivers, including how is it done, how to soften the area to drill and tap, how to determine if it is hardened steel, etc? Details on what is needed to do the work would be appreciated. Jerry Spadorcio Author Norman Johnson responds. Thank you for the compliments regarding my article.

We’ve discussed your request for an article on installation of scope rings on hardened rifle receivers with the editor and are planning to arrange such an article in an upcoming issue. BLR Long Action I have a Browning Lever Action chambered in .30-06 that will not cock. The hammer is pushed back by the bolt but not far enough for

READER FORUM CONTINUED

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the sear to engage. I can observe the hammer rubbing on the gears on the bottom of the bolt and can stop the bolt at the point where the ramp on the bolt has pushed the hammer as far as it will go downward. At this point, pushing down on the top of the bolt with very little effort engages the sear. The hammer is a two piece unit and the top part rotates around a pin. When rotated to the rear to the fire position, the rearward movement is stopped by a spur sticking up from the bottom part of the hammer.

I can put a small piece of debris between the spur and the top part of the hammer and it will function normally. What is the proper fix for this condition? I have some ideas but would like to know the right way to fix it. I would also like to know how to properly headspace this rifle. I have an AGI video on the .308 model but not the long action and they appear to be quite different.

First thing we'd do is try anew, factory hammer because it sounds like there's more than the needed amount of "play" in the firing mechanism. As for headspacing, get a GO and NO GO gauge in .30-06. If the bolt closes on the GO don't sweat anything. If it closes on the NO GO you have a problem with excessive headspace. Unless you've had some experience correcting the condition, return the rifle to Browning rather than risk what could be a serious accident.

Winchester Model 71 A customer brought a Winchester Model 71 lever action rifle chambered in .348 Winchester (serial number 314XX) with a stuck case in the chamber. The case suffered separation and was extracted with a common epoxy-fill method. The customer mentioned that the lever/bolt were forced open upon firing the suspect handloaded cartridge that sepa-

rated. After a function test was performed I noticed excessive forward and backward movement of the trigger along with sideways play.

I replaced the two piece trigger and sear along with the associated pin and that tightened up the sideways slop. Preston Potvin Why is there still forward and backwards movement in the trigger when the sear is either engaging the hammer or not? I have studied the two parts (trigger and sear) in relation to each other and can see no reason why I couldn't add some weld to the trigger top where it meets the sear and then filing down the weld to mate the two parts for a better fit.

I am seeing a 1/32" gap in the two parts, old and new. Robert Coles MOA Gunsmithing We suspect the overload may have also damaged the receiver. We suggest you call Nu-Line Guns (nulineguns.com), which was previously a Winchester Authorized Service Center, and ask to speak with Jerry Stevens. Extractors What will happen if the extractor hook in a pistol is too close to the slide face? Mark Amann D. A. M.

Good Wood, a Veteran Owned Business Most likely there will be poor or no extraction because the extractor can't grab on to the case. The cause might be a broken extractor or totally useless extractor spring but check the extractor cut in the breech face. If it's solidly packed with fouling then you have another reason the extractor can't settle in ahead of the case rim. The worst case scenario is there is a broken or badly worn slide lug allowing a barrel set-back condition.

Raptor Rifle Have you ever done an article on the Raptor .270? This company was bought out several years ago by Mossberg and I need to know where to purchase parts. Verlin Weaver Mountain Man Gun Works No on the article. For parts, call Vic Havlin of the Mossberg Collectors Association. AG

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