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INSIDE THE ARCHIVE

DIAGNOSING HUNTING RIFLE ACCURACY, PART ONE

HAMMER-FORGED ACCURACY • BEDDING THE MODEL 504 REMINGTON RECEIVER RING • THE GSG 1911 .22 • ELECTROP...

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 137

DIGITAL ARCHIVE EDITION

Preserved for the bench.

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PEOPLE & COMPANIES

Hammer-Forged Accuracy

BY AMERICAN GUNSMITH EDITORS MAY 2015

ORIGINAL PP. 2

From Dave Sengelaub, Sunnen Products Company. Hammer-forged barrels are not well thought of by precision rifle shooters but a critical manufacturing process used by the hammer forging guys is suddenly getting attention from custom barrel makers today. It's honing. Honing produces a high-quality bore surface fast, which is critical to hammer forging. Surface imperfections in a barrel blank before hammer forging will tend to be amplified as the blank is formed on the rifling mandrel.

And if the bore is chromed afterward, imperfections in the surface finish become even more obvious. Surface finish is the one feature of the barrel that cannot be controlled in hammer forging—garbage in garbage out. You may ask, "What about a reamed bore finish?" Sure, hammer-forged barrel blanks are gun drilled and reamed, just like all barrels, but a reamer starts to dull after the first part and scratches in the bore get rougher.

For this reason, makers of hammer-forged barrels regularly hone the bores of barrel blanks to enhance the product and improve process consistency. Honing dramatically improves bore diameter size uniformity and accuracy, surface finish, and roundness throughout the length of the barrel. It can certainly be used in place of a pre-rifling lap. The chief difference between a lapped and honed bore is the direction of the finish lines in the bore.

Honing leaves fine spiraling crosshatch lines, while a lap leaves lines going longitudinally in the bore. After rifling, the manufacturer can remove the crosshatch fin-

ish with a quick lap if desired. Honing is fast, accurate, and can be automated. Its surface quality and geometry can duplicate lapping, except for the longitudinal lines of the lapped finish. Honing is one of the processes used to make affordable, massproduced, hammer-forged barrels that regularly hit MOA (minute of angle) accuracy.

Mere MOA accuracy may be a joke to precision bench rest shooters but it's a breakthrough for the consumer market and competition has some manufacturers bragging about half-MOA as their new standard. For custom barrel makers, honing is a time-saver and cost cutter. A few minutes on a honing machine can cut lapping times in half, leaving a crosshatched surface finish in single or low double-digit Ra.

Honing is the same process used to make diesel fuel injectors with bore roundness and straightness controlled to fractions of a micron ($<0.000040''$), with surface finish $Ra \leq 0.15 \mu m$ ($6 \mu in$). Sunnen Products Company (sunnen.com), makes these machines and has been a supplier to defense contractors and commercial firearms makers for decades. The company recently introduced anew machine for .17 to .50 caliber. Its spindle can correct bore size imperfections so small only an air gage can measure them.

Early users aim to make sub-minute accuracy the norm for their standard rifle barrels. Custom barrel makers are catching on to this, too, so it's time for a tip of the hat to the hammer forging guys for leading the way.

PEOPLE & COMPANIES

Bedding The Model 504 Remington Receiver Ring

Sometimes a small—but critical—bedding area can be most difficult to deal with. The Model 504 Remington receiver ring is a typical example of this. Here's how to fix it.

BY NORMAN E. JOHNSON MAY 2015

ORIGINAL PP. 3-5

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The Model 504 Remington .22 rimfire rifle is capable of match grade accuracy, although bedding improvement is likely required or accuracy may be compromised. One crucial bedding area involves the very forward part of the receiver ring, which is only about a quarter inch in length. By comparison to most receiver ring bedding surfaces, this span provides only 0.025 inch of surface compared with a full inch on most rifles.

This does, however, provide an adequate surface for bedding, provided it is very solid and properly fitted to the receiver. Brass is a good choice for making this bedding support. This can be formed from a worked over piece of brass pipe coupling or the like, which saves a lot of work. Immediately back of the leading edge of the receiver is a diagonally positioned barrel lock down bolt.

This partially countersunk socket head bolt is mortised into the stock with the end of the screw protruding. The function of this locking bolt secures the barrel to the receiver. Note the linear slit in the receiver with the lock bolt encroaching the primary bedding surface. This design makes it a very problematic area. Working through the opposing side of the receiver. This screw poses a real problem in bedding the remaining portion of receiver.

This front receiver screw enters the bottom of the receiver ring about a quarter inch rearward of the leading edge. A small notch must be cut in the brass bedding piece for screw passage at this juncture. The Receiver Bedding Ring A lathe was used to machine the special brass part to exact receiver

BEDDING THE MODEL 504 REMINGTON RECEIVER RING CONTINUED

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The front action screw passes through the half-moon shaped cutout seen at center. ring diameter. It was then cut to half circle shape for precise receiver ring fit. Then, with the part ready, a channel was made in the stock, allowing space for Brownells Steel Bed used as the bedding/bonding material. During installation a drop of cement was applied to each corner of the receiver bedding ring to hold it temporarily in place onto the receiver.

Release agent was placed where needed, avoiding contact with the brass bedding ring. Steel Bed was then mixed and the action lowered into the stock with the rear and center screws drawing it down and holding it in place. After 12 hours the action was removed from the stock and excess bedding material removed. Conclusions Anytime top accuracy is expected from a rifle, all areas of the action bedding must be considered.

In the case of the Model 504 Remington, the forward area of the receiver is The three action screws were alternately torqued to test for action springing and finally torqued to 20 inch-pounds. The rifle was then tested for accuracy and it showed noticeable improvement. The stock is masked to prevent over spillage of bedding material onto the stock.

BEDDING THE MODEL 504 REMINGTON RECEIVER RING CONTINUED

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PISTOLS

The GSG 1911 .22

Working a great rimfire 1911 clone.

BY ROBERT K. CAMPBELL MAY 2015

ORIGINAL PP. 6-10

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The world of 1911 handguns has a branch that doesn't command the respect it should: .22 rimfire clones. While there are a number of inexpensive .22 caliber handguns that are far from well made, the GSG 1911 .22 is of good material and quite popular. The pistol is manufactured primarily of non-ferrous metal but this works just fine with the low recoil and pressure from the .22 Long Rifle. The finish is painted, either black, coyote tan, or olive drab.

Interestingly, many of the GSG's internal parts interchange with standard 1911 parts. While fitting is often required of any 1911 part, the interchangeability is good and includes stocks, slide stop, slide lock safety, mainspring housing, grip safety, magazine catch, sear and sear spring, plunger tube assembly and the trigger. Theoretically, you could fit Wilson Combat parts if the 22 is a serviceable .22 pistol with much to recommend. owner wished a first class trigger job.

When you calculate the need for hand fitting, the percentage of interchangeable parts may not be that high but the possibility of fit with Series 70 parts is interesting.

My personal short slide GSG pistol was fitted with a set of presentation grade grips from Zipp's Grips.com. And I do mean "fitted" as they were not a simple drop in. Although the grips were cut for an ambidextrous safety, the safety of the GSG pistol did not operate correctly when these were installed.

A slight relief of the ambidextrous cut out was necessary. Not a major chore but one that was needed. Of course, Zipp's designed the grips for the 1911 not a 1911 .22 near copy, but they are certainly a close fit. The GSG 1911 .22 has the same safety features as a centerfire 1911. The grip and slide lock safeties operate in the same manner. The GSG pistol also incorporates a firing pin block of the Series 80 type. This firing pin block is an important feature of this handgun.

Another uncommon feature is the GSG magazine safety. The pistol will not fire when the magazine is removed. This is a safety device that may be beneficial for beginners using the pistol as a trainer. While more experienced shooters may not care for the device, it should never be removed. Feed And Handling Problems When work-

ing with the GSG 1911 .22 and other SIG .22 caliber 1911 clones, problems encountered are less due to design but more to ham-handed handling.

This is an inexpensive handgun but not a cheap one and the accuracy and reliability demonstrated are good. A number of cautions apply. The pistol breaks down in a manner similar to the 1911 .45 but not identical. The slide stop is removed and then the barrel pin pushed out to the left. Another pin must be removed using an Allen wrench. This pin screws out to the right. This system must be used with the 1911-22 as it is a blowback rather than a locked breech pistol.

The GSG gun functions with a very low power cartridge in comparison to the .45 ACP 1911. This system doubtless adds to the pistol's rigidity and fine accuracy. Once the slide stop and the two pins are removed the pistol's slide is removed from the frame. The barrel and slide are removed together. The recoil spring guide rod is removed by compressing the spring to the rear. The barrel lifts out easily.

THE GSG 1911 .22 CONTINUED

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Above center: Extra front sight blades area welcome addition to the handgun. Routine cleaning is simple. A problem I have seen is the barrel retaining pin in the frame has been over tightened and stripped out. The handgun was returned to the distributor and repaired. Another problem that occasionally occurs is the sight screws being stripped out. This is another case in which the pistol is returned to the importer as there is no cure as inexpensive as shipping the pistol.

When adjusting or changing the sights for a customer care must be taken not to strip these small parts. The front sight is held to the slide by a tiny set screw. The pistol, to the credit of GSG, is supplied with two alternative sights to allow the pistol to be properly sighted. The tiny set screw is easily stripped by applying too much pressure. The rear sight is adjustable, however, the same

type of small set screw is used. The proper Allen wrench is supplied with the pistol to adjust these rear sights.

These are very small parts that would be easily stripped so caution is advised when working with the GSG sights. The sights can be changed out and regulated. When changing the front sight, simple rules are followed. If the pistol is shooting low then a taller front sight is installed to raise the point of impact. If the pistol is shooting high in relation to the point of aim the lower front sight is used.

The sights are easily changed by use of the supplied Allen wrench but caution must be used in tightening the tiny screw. When adjusting the rear sights in the standard manner, moving the sights left or right to move the point of impact, care must be taken not to strip the tiny screws. Feeding Issues In one case the feeding issue of the GSG pistol was solved by proper procedure.

The customer reported that the first round in the magazine was catching the top of the cham- Below left and center: The Wheeler screwdriver kit from Cheaper Than Dirt came in handy when working with the GSG.. A big plus. This is the BTP from Jeffery Custom Leather. ber and refusing to feed. After some working with the slide, once the first round fed properly the following rounds usually fed, chambered and ejected.

Unlike some .22 caliber self loaders the GSG feeds most high velocity .22 caliber ammunition just fine. I keep Fiocchi .22 HV on hand for the pistol, which has proven brilliantly accurate and reliable. So far, CCI Mini Mag, Fiocchi HV and Winchester M22 and Wolf are reliable. I fixed the issue by downloading the magazine, working to only three rounds in the magazine. The magazine fed perfectly up to eight rounds.

THE GSG 1911 .22 CONTINUED

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It would be very easy to strip. Above center: A threaded barrel is quite useful for hanging accessories on the barrel. This is the CW Accessories compensator. At nine rounds the bullet nose caught on the chamber. The cure is to keep the magazine horizontal when loading and to be certain the cartridges This .22 cartridge took a good whack from the firing pin. This is the bane of .22 caliber pistols. Below center: The supplied Allen wrench for removing the thread cover from the barrel.

The tiny set screws are spares supplied with the pistol. You may need them as they are easy to lose! are pressed into a nose down at-

titude. The bullets are loaded one by one, allowing spring pressure to catch each bullet, rather than holding the magazine follower and spring down and dropping the bullets into the magazine. This loading sequence produced better reliability. Another cure would have been to take a coil out of the magazine spring.

When the CW Accessories fifteen round magazine upgrade is used, function is excellent. On another occasion the magazine seemed to be orienting the cartridges in the proper manner but the bullet nose of every type of ammunition I attempted to feed in

the pistol did not feed correctly. This was primarily a problem with the first cartridge although it also occurred during a firing string. In this case the cure was to very slightly polish the feed ramp.

When working with the .22 caliber rimfire cartridge everything is in miniscule scale and only a very slight polishing of the area was needed. A light touch is important. There was simply a slight ridge, seen under magnification, on the feed ramp. A piece of 600 grit sandpaper was placed on a wooden dowel and worked over the feed ramp.



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CW Accessories is offering GSG upgrades. Among the most interesting products offered for the GSG is their compensator. There are two designs, with one somewhat larger than the other. Chet Whistle's compensators are well made of good material and offer a real advantage in competition shooting. Although the recoil of the .22 Long Rifle cartridge is modest, these compensators direct gas upwards and further reduce recoil to the point that there is a noticeable advantage in competition shooting.

During the evaluation of this compensator I took several images of a GSG pistol both with and without the compensator as the pistol was fired. The difference in the recoil arc was clearly noticeable with the compensated pistol. When fitting the compensator the first thought is that it is simple enough to simply screw the compensator on. The rub is that the ports must be oriented upwards. After several tries it was decided to get as close to the end of the threads as possible with a compensator with blue Loctite.

Just a tiny amount holds the compensator in place. A note on magazine modification. When loading the ten round GSG magazine there is some effort required but this is a first class unit. CW Accessories offers a well designed magazine loading button that makes loading the magazines much easier. With the standard magazine simply drill out the bottom foot of the follower to accommodate the magazine loader. A 1/8" drill bit is used. The magazine loading assist knob may then be used.

This loading assist may also be used to remove the barrel pin during disassembly. The most interesting product from CW Accessories is the fifteen round magazine conversion. By removing the magazine baseplate and replacing it with a deeper unit, special magazine spring and follower, the factory SIG or GSG magazine is converted to a fifteen round magazine. After extensive use the conversion has proved reliable, solving many of the problems with the original magazine's loading problems.

THE NEW FOLLOWER IS ALSO

THE GSG 1911 .22 CONTINUED

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Above center: The barrel retaining pin is removed after removing the slide stop. The slide stop (center hole), barrel retaining pin (left hole) and slide retaining pin (right hole) is removed prior to disassembly. cut for the loading assist so this step isn't needed. The new magazine conversion was proofed with some 200 cartridges from Wolf Performance Ammunition with excellent results. The original guide rod and recoil spring for these handguns is less than robust.

While the pistols have proven generally reliable the guide rod seems to give trouble after 500 rounds or so in some pistols. GSG Left

above and After a bit of polish the feed reliability of this particular 1911 .22 was improved. Below center: The GSG 1911 features a Series 80 drop safety. has made them good under warranty but the situation isn't ideal. The latest generation guide rods are better than the first but the best bet remains the CW Accessories guide rod.

This unit is specially engineered to improve function. The new guide rod is 0.010 larger in diameter and 5/8 inch longer than the factory recoil guide rod. The original GSG recoil spring was a tapered directional type. If installed backwards the original recoil spring

would cause function problems. The new spring isn't tapered, an excellent fix for a real problem. The new short slide GSG guns feature a removable light rail.

It looks as if it should be removed from the bottom but the slide must be removed to loosen the screws holding the light rail. The GSG 1911 .22 is a serviceable, well-made bargain but it does use quite a few small parts that may be difficult to handle. Care must be taken in working with these parts. The rest is traditional troubleshooting. AG

MACHINING

Electropolishing & Fire Lapping

Making myself extremely unpopular with gun barrel manufacturers.

BY JOE CARLOS MAY 2015

ORIGINAL PP. 11-13

When I first came on board as the Armorer for the Army Reserve Marksmanship Program I machine rest tested 135 A2 National Match uppers. The results made my jaw dropped to the floor. Only 39 of them would shoot MOA. I seriously questioned my sanity in getting talked into accepting such a project given the hand I had been dealt. 96 of those uppers were very sick! On top of that, we had no replacement barrels and our budget couldn't afford that many barrels at one time.

On taking throat gauge readings and bore scoping those 96 it was immediately obvious that hardly any of them were really shot out. They just weren't shooting well. Either those 96 barrels were born bad or something else was wrong with the guns that kept the barrels from giving the accuracy they were born with. I briefly toyed with the notion of sending some of the barrels back to their manufacturers to have them go over them and see what was wrong.

The Army Reserve contracted with a competing team for maintenance support and it was obvious that the uppers had a hodgepodge of barrels on them. The uppers were serial numbered so I contacted those folks and asked if they could provide a list of what brand of barrels were on what uppers by serial number. I was told they kept no such records, removing any hope about getting support from the barrel makers. I called them "mystery barrels" and the phrase seemed to catch on with the shooters.

This also convinced me to keep good records, which has been one of the keys to my success in research and gunsmithing along with my experiences as a shooter using government firearms that flat weren't built right gave me the motivation to try extra hard to help my shooters. Given my

lack of funds and the need to get the uppers shooting better I instituted my "Upper Quick Fix Program." The program combined hard work and ingenuity using low cost methods.

One part of this was covered in "The Relationship Of Barrel Extension Diameter To Accuracy In The AR-15" (March and April 2013) about properly mounting the barrel extension in the upper receiver. My initial attempts involved the use of Green Loctite #620 to coat the barrel extension and the inside of the upper receiver during assembly. That alone resulted in an 18.6% average reduction in group size. Best of all it didn't cost a dime other than a lot of man hours of labor on my part.

Since I was getting paid a very modest flat rate rather than a normal hourly stipend that was a real good deal for the Reserves. I later improved the process to add thin shim stock around the extension in combination with the Loctite, doubling the effectiveness. Later, I worked with BAT Machine on an improved match barrel extension in incremental sizes replacing skinny, low-bid stock extensions and shim stock.

Using the improved processes and parts I am currently realizing about an average reduction in group sizes of 35% compared to normal rushed assembly techniques practiced by other gunsmiths in the AR business. Another fix was "Gas Tube Alignment" (March 2014) based on finding uppers with gas tubes either in contact with the float tube or not in alignment with the bolt carrier key, resulting in fat groups and lots of fliers. Again, the only cost to fixing the problem was sweat and long hours.

In "AR-15 Upper Quick Fixes: Match Bolt Carriers" (May 2014) there was some fiscal expense to substituting these for regular carriers, second in cost after electropol-

ishing. The average accuracy gain was 8.8%. Since that article was published I have been further improving the alignment of the bolt carriers using Anti-Tilt Pads, shrinking groups an additional 14%. Combined with the match carriers, total accuracy gain is about 20%.

When I started getting budget money I included electropolishing the bores of poorly performing barrels along with fire lapping. During my decade as Team Armorer, I fully cut the group sizes of the guns in half and every one of the uppers would shoot sub-minute with preferred ammo. Electropolishing As I was bore scoping those 96 sick uppers I noticed a fair number of them were rough as a cob.

You flat can not pick a good barrel just by eyeballing barrels with a bore scope, however, you can identify a barrel that is likely to shoot poor. Examples are when you see pitting, especially near the crown. Another good predictor of poor performance is when the lands at the back of the barrel in the throat area are uneven in their start points. This is usually an indication of cleaning rod damage and it allows bullets to tip off center when starting down the barrel.

Such a bullet will be boogered and will never straighten itself. Heavy fire cracking at the back of the barrel can sometimes point to a barrel soon to go out. Another less reliable indicator are barrels that appear rough like some of the ones I was identifying. Don't get me wrong, I have had some really fire cracked and ugly looking barrels shoot well but their percentages in the whole population would have been less than ugly barrels that shoot poorer than average.

The theory is that the rough barrels tear at bullets and tend to foul more, degrading accuracy. Barrels that are poorly

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broken in also exhibit some of these tendencies and I don't think there was much attention before I came on board as Armorer to proper barrel break-in. Some barrel makers lap their barrels one or more times in an effort to polish out some of the roughness to try to eliminate these potential problems. Such barrels normally cost more but shoot better. I break-in every barrel I sell or install. You can throat gauge this, air gauge that, and gauge something else.

You can look in bore scopes till your eyes bug out but the only way to know if a barrel will shoot is to shoot it! Whether in a machine rest or from the bench rest with sand bags you must shoot it to know for certain what its current capabilities are. Barrels never got the memo that they are supposed to quit performing at some arbitrary round count. Nor did they get the word that when they grow ugly they are supposed to start shooting fatter groups.

They are very much individuals and don't necessarily follow our expectations. I selecting barrels for various treatments by shooting them on a machine rest and not because they were just ugly. Then I chose some of the ugly ones to try fixing by electropolishing or fire lapped. Back in the early 2000s there were two ways to polish rough bores that hadn't been factory lapped. The first was called electropolishing and was done by Black Star down in Texas.

They used an acid in the process and the environmental police just made it so costly for them to store and dispose it that they are no longer offering the service. Having a barrel electropolished at the time likely ran 1/2 to 1/3 the cost of replacing a barrel. They also purported to perform the polishing in such away as to end up with a gradual taper to the bore. It would be slightly fatter at the breech end and more constricted at the muzzle.

It has long been a barrel accuracy theory that such a taper enhances grouping performance. I only sent a few of my very worst barrels on the trial run and they came back improved. As I became more confident with the results I increased my shipments. I ended up with a very noticeable 18.9% average improvement from the process. You could easily see in the bore scope how polished and smooth the finished product looked. Electropolished bores seemed to foul less and clean up considerably easier.

In 2005 Sierra came out with their 90 grain boat tail bullet for the AR-15 and I started evaluating it in early 2006. The jacket on the bullet was too thin and I discovered that many of them would blow up on the way to the target. Sierra still credits me for being the first reliable reporter of the problem but before long nearly everybody that shot the bullet had the dubious experience.

In trying to make the bullet work I considered Black Star's electropolished smoothed bores and hoped that the process might also make barrels more "Sierra friendly." I had just received shipments of barrels for 90 grain loads and split each shipment in half, keeping one as a control group and sent the others to be electropolished. These barrels consisted of 1:6 twist Douglas stainless, 1:6.5 Krieger chrome moly, and a mix of 3 and 5 groove polygonal 1:6.5 Pac Nors in both steel types.

Since we were new to 90 grain bullets I also split a shipment of 1:8 Walther stainless barrels purchased to shoot 80 grain bullets. Part of the results were expected. The incidence of thin jacketed 90 grain Sierra Match King blow ups went down but didn't cease. I also found polished bores allowed me to use 0.3 more grains of powder. The surprise was no accuracy improvement over non-electropolished barrels.

This was the first time I had send brand new barrels to Black Star instead of poorly-performing mystery barrels. The conclusion I came to was that the electropolishing process was an effective repair tool but a waste of money except for lowering Sierra 90 grain bullet blow ups and making cleaning easier. It is a moot issue now but most barrel makers will void any warranties if a barrel is electropolished. Fire Lapping As with electropolishing, fire lapping likely voids any warranty.

After exhausting ammo, assembly, and tuning tips, contact the barrel maker for their suggestion before resorting to fire lapping. Since I was dealing with mystery barrels I had nothing to lose. Fire lapping was about a third the cost and doesn't involve shipping a gun or barrel. Purchase Final Finish bullets from David Tubb Superior Shooting Systems (davidtubb.com and load accordingly. The bullets are coated with an abrasive.

Starting with an immaculately clean bore, fire the most abrasive first and work your way down towards the finest, cleaning between each 10 shots of the fire lapping process (every time you change abrasives). At the end you clean again and test. My results averaged again in accuracy of 19.3%, almost the same as electropolishing. I have never proactively fire lapped a bore and based on my lack of success in doing so with electropolishing I doubt I ever will. If it ain't broke, don't fix it.

FROM THE ORIGINAL PAGE

I have fire lapped about a hundred barrels and don't recall of a single one shooting bigger groups afterward. I think that is a fair endorsement of the process. If you buy a quality barrel from a conscientious manufacturer that does a proper lapping job before it leaves the factory you shouldn't find yourself in a position where you have to do the barrel maker's job with abrasive bullets. After having tested several hundred

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ELECTROPOLISHING & FIRE LAPPING CONTINUED

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barrels and keeping good records I have discovered which barrel makers get it right at the factory and I only buy barrels from two makers now. Since switching to those two manufacturers several years ago I haven't had to resort to fire lapping a single barrel! Make no mistake, you are sanding off metal during fire lapping. You can measure this in terms of throat erosion. I have seen some fairly scary increases in throat measurements taking readings before and after fire lapping.

Just like regular throat erosion from normal shooting, this is extremely variable by individual barrel. The button rifled barrel maker camp swears up and down that the steel they use is every bit as good as the steel in cut rifled bores. After having fire lapped a bunch of both I tend to question that assertion as a number of other people have. On average, I see way more forward throat advancement from fire lapping button rifled bores than I see with cut rifled ones.

I have also seen more need to perform the fire lapping to button rifled bores. I believe fire lapping can shorten the life of a barrel but to what degree depends on each barrel's own characteristics. One of my shooters once said about barrel longevity, "If a barrel isn't shooting well why would I want it to last along time in the first place?" I will take an improvement in accuracy over long barrel life every time without hesitation.

I have heard of a few people advocating fire lapping to replace a normal barrel break-in. I have never tried it but am hesitant. Fire lapping will obviously move the throat forward more than a conventional 10 shot break-in and recommend that first. After a conventional barrel break-in give a barrel at least 200 additional rounds of "seasoning", cleaning frequently. Avoid getting the barrel hot during that initial period of service.

It often takes that long to shoot off gas port burrs, finish the burnishing process, and wear down the angular tool marks from the reamer at the back of the barrel. Sometime after that 200 round seasoning,

call it an extended break-in period, is the time to determine if a barrel is shooting badly enough to warrant afire lapping. For you grown ups with AR-10s, Final Finish bullets are also available in .30 and other calibers.

You can also get .22 LR ammo loaded with fire lapping bullets in case you get a rim-fire with a rough bore. Army Contracting stuck the USAR Shooting Team with some dedicated .22 LR uppers on a low bid purchase one time. They had barrels on them made by some folks who normally made muzzle loader barrels. They were rough as a cob and I fire lapped every blessed one of them.

The fire lapping, in connection with a lot of other work, resulted in a 31% reduction in group size which still didn't make them "good" but it did make them "better". The folks that make the regular fire lapping bullets also make a throat maintenance bullet. The idea is to fire one or two of these rounds for every 100 rounds of normal ammo. As a military armorer that wasn't practical because the guns were normally issued out and distant from me.

I talked to the smart guys at Superior Shooting Systems and they suggested that I fire ten of the throat maintenance bullets as guns cycled through my shop for routine maintenance or work. I would clean the gun and then shoot a group or two with known ammo lots, then clean it again and fire ten throat maintenance bullets, then clean a third time and retest with the same lots of ammo as the first group.

The second test firing would always show a spike in accuracy even with good barrels that had been lapped at the factory when new. I performed that before and after test numerous times and am absolutely sure this works. I performed the throat maintenance on chrome lined bores that had already eaten through the chrome at the throat and it worked just like non-lined barrels.

I was always reluctant to use the whole fire lapping process on a chrome lined bore for fear of eating through the chrome pre-

maturely Conclusion I think that somewhere early in our educations when we professional gunsmiths are taking "Gunsmithing 101" we are ingrained in the notion that if a gun isn't shooting right to suspect the barrel first. Perhaps that is a good idea with some firearms designs but not necessarily with the AR-15.

I don't want to the impression I fire lapped or electropolished every one of the barrels on the 96 uppers that my initial machine rest tests identified as being sick. Some uppers just responded to simpler fixes, however, I did end up with a large sample size that were either fire lapped or electropolished to have good statistical confidence in my results and the improvement percentages. A few professional gunsmiths steer away from fire lapping because it offends their sensibilities.

The technique doesn't require an expensive four or five figure price tag for specialized equipment, nor is it controlled by a fancy CNC program. You don't need to take a course at a community college or professional trade school in order to perform the process. Perhaps worst of all, even their customers can do it just as well. Isn't it our job to make guns shoot better regardless of the method used? Techniques that occasionally take us out of our ivory towers aren't necessarily a bad thing.

My goal, as always, is to help you achieve your goals. I hope this and my other articles help make ARs shoot better. In the mean time I am going to wear a disguise every time I am around any barrel makers as I suspect I have ruffled a bunch of feathers in their camp. Perhaps I had better do likewise when around my fellow professional gunsmiths because I have likely alienated a few of them also for suggesting a method as "crude" as fire lapping. So be it.

I mentioned in one of my previous articles that in former lives I have been a Tax Assessor, State Game Warden, and Drill Sergeant so I am used to having few friends and making people angry. AG

MAINTENANCE & REPAIR

Diagnosing Hunting Rifle Accuracy, Part One

Three things I'd rather not hear are, "I'm from the IRS," "We're out of beer," and "This damn rifle won't shoot."

BY WENDELL DEANER MAY 2015

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'm la chicken when it comes to difficult subjects but some things have got to be addressed. The first two have fixes of their own, so let's talk about rifle accuracy. When a customer puts his rifle on the counter for you to fix, he may have preconceived notions of what needs to be done to get it shooting at that 1/2 MOA (minute of angle) mark they know it's capable of. If you're really a good gunsmith you can make that happen; if not... well. The first thing that comes to my mind is questions.

Is it a lever, pump, single-shot, or bolt action? Is it new or just bought used? Is it a trusted rifle that suddenly quit shooting as well as it used to? There are many more questions that will come later. Let's start with the kind of firearm, what kind of accuracy is expected, and what level the manufacturer maintains is "in spec." All of these types of rifles can shoot well for their intended purpose if they are properly cared for.

Levers and pumps are not renowned for being more than 2-4 MOA shooters, but many will surprise us. Single-shots and bolt actions are the accuracy kings, with the nod going to bolt actions. Along with the action type the next question should be what is

this rifle intended to do? A heavy-barreled varmint rig with a powerful scope should generally shoot anywhere from an inch down.

A big-bore double intended to shoot elephants at close This group is representative for this pump-action rifle with factory ammo. range is a viable rifle if both barrels will overlap at four, five, or even six inches. Elephants and Cape buffalo have a huge kill zone compared to a prairie dog and are shot at much closer range. The next question is what accuracy level does your customer expect. Is it realistic or just so much powder smoke? Is he known to you?

Right now I want to insert a caveat: Field accuracy and bench accuracy are not the same. There are different philosophies for each discipline that must overlap but we're talking about wringing the most accuracy from our rifle regardless of how well it is used in the field. The shooter is actually the main influence on any sort of accuracy and due homage must be paid to his influence (good or bad) regarding what he and his rifle can do.

In the early eighties when synthetic stocks were first coming into vogue I chanced upon a man at my local range who'd just

paid a gunsmith to install a fiberglass stock on his 7mm- 08 Remington deer rifle. I didn't know this man but I did know who had fitted his stock. The gunsmith did a good job and I thought his rifles were elegant for the price. My new shooting friend immediately complained to me that his rifle didn't shoot any better than before he'd shelled out his money for the modification.

It shot as well, just not any better. I try not to get into any arguments with people I just meet and refrained from informing him that perhaps the stock wasn't intended to make his gun shoot better than usual but to be more stable and consistent in the field. The big issue was having a rifle impervious to moisture thereby eliminating the tendency of a wood stock to warp and change impact. Other accuracy measures could be taken but just the stock was not the cure-all this guy thought it was supposed to be.

This shooter and others have different expectations of reality. He might not have been as knowledgeable as his gunsmith thought he was. The 'smith just took the job rather than having a little talk to make sure they were on the same page. This guy was bad-mouthing the gunsmith who had

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actually done a good job, but the old word-of-mouth gotcha was at play. A lever action and some of the old pump-actions are usually not expected to shoot any better than four MOA. While I haven't fired a huge selection of these two types, I have one of each that will do much better than that, and anecdotal evidence proves my point. The first is a lever-action Model 94 Winchester chambered in .30-30 Winchester. It isn't anything special, bought long ago at Kmart for around a hundred bucks.

I have shot this gun with jacketed factory and handloads at around two inches at 100 yards with open sights if I do my part. I switched to shooting cast bullets almost exclusively with it and installed a Williams Fool Proof receiver sight because these loads shot so low the factory buckhorn rear sight could not be adjusted to meet point of impact. With a good load I'm getting around two inch rounded groups at fifty yards.

This level of accuracy is more than good enough for plinking, and I think with more load development and the right bullet I can do better than that. Would this kind of accuracy satisfy your customer? I bought five hundred .30 caliber flat-nose cast bullets suitable to shoot in this rifle from a commercial manufacturer. On the web site where I ordered there was a review stating that they didn't shoot worth a darn. I was able to obtain the groups mentioned above without too much trouble.

The difference is that I know a little bit about loading cast bullets but don't think the reviewer did. Cast bullets have been used in rifles for centuries but I'm afraid that we have forgotten a lot of the knowledge that sustained our grandfathers on this subject. Maybe this man's test rifle didn't have the right kind of twist or rifling type to wring out the best in accuracy with lead-alloy projectiles (Marlin Microgroove are an example.) Maybe his loading technique wasn't up to snuff.

Maybe the groove diameter was not standard. Who knows? These bullets are flat base with no gas check. I started by weighing all of them on an electronic scale and sorted the bullets by weight. I flared the case mouth properly with a set of RCBS Cowboy dies that are of slightly different dimensions than their regular dies to load cast bullets without deformation of the base. Bullet hardness was checked using Lee Precision's handy little tool for this purpose.

Lee's Modern Reloading has an excellent treatise on how hardness effects pressure on cast bullets. The Lyman's Cast Bullet Handbook and Black Powder Handbook & Loading Manual, countless articles from Rifle and Handloader magazines and others have been consulted for years. A lot of cast bullets shooters should read more and com- The Model 141 Gamemaster in .35 Remington is not drilled and tapped for receiver sights or scope mounts.

The Gamemaster Model 760 is scope ready. 280 Remington using bulkbought 150 grain Core Lokts. I taped a dime there to show how small it is. plain less. One-hole accuracy can be achieved with cast bullet shooting if the Nimrod is willing to take the time to learn. I will give one more example before we move on. Several years ago I met up with a man and his partner shooting at the 100-yard bench.

He was using a now forgotten brand of lever action trying out another now forgotten brand of so-called .45 Colt "cowboy loads" he had picked up at a local shop for an outrageous price. He was disgustingly flicking the brass off the bench onto the dirt even though we're supposed to clean up after ourselves. He told me this ammo shot poorly. I pegged this guy as a tyro who knew absolutely everything about shooting. What did he expect cowboy ammo to do except go bang and knock over a steel target at ten feet?

That was all it was made for, but he wanted inch groups at 100 yards. My mama didn't raise no fools, so I asked him if I could recover his empty brass. He gave me a sarcastic, "Help yourself," and I scarfed up fifty once-fired cases. I've loaded them with cast bullets (probably getting better accuracy than this shooter) about five times so far just using standard .45 Colt loads and I still have a ways to go before the necks start splitting.

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375 H&H caliber, certainly capable of “minute of Cape Buffalo” groups. 30-30. A little tweaking will do better. His partner had a bolt-action rifle and asked me if I knew anything about sighting in as he couldn’t hit the paper in the same place twice. As is my habit, I might have tried to give him a hand, but I begged away from these two and left the range without even shooting my rifle. After observing their behavior I was not in my normal Good Samaritan mood. These area few of examples of customer mindsets.

Suck it in and try to explain why what they want may not be what they can get. Be prepared to bite your tongue when they outline what they might think of your gunsmithing abilities. I was reading a book printed in

1974 written by a respected gun writer about what kind of accuracy we can realistically expect. At that time his standard for state-of-the-art winning benchrest rifles was under 0.2 inches. That’s five five-shot groups at 100 yards averaged.

Even today if you can shoot that well you’ll have a good chance of taking home gold. Wind, weather, loss of concentration, anything can take an errant shot out of the group, sometimes way out. This extreme level of accuracy can only be achieved using tight custom chambers with neck turned cases, a perfectly bedded rifle and barrel, complicated loading technique, and a competitor as consistent as the rifle.

A drop of sweat in the eye, a twitched trigger finger, not correctly reading that last wind flag down at the end, or other little things will take you out of the winner’s circle clear up to that last critical shot. If you are not working on benchrest rifles just forget about this stuff, right? No! Remember that the BR crowd has given us most of the standards for accurizing rifles known today. Back in the 1940s an inch group was almost a miracle. The bench resters have led the way.

Throughout this article we will be promoting techniques pioneered and perfected by those who came before. If you have time, the bench-rest game will give you aper-

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spective on accuracy that is difficult to ignore. What does that have to do with our fictional customer who doesn't give a darn about shooting off a bench because there aren't any in the woods? The only way to know how your rifle will shoot is to fire it from a good rest using the best technique you can muster. We already know how you can shoot, but what's that have to do with your rifle? Awhile back I was shooting at my local club at 200 yards.

A man and his father pulled in the parking lot and started to take out their gear from the truck. They came up to me and the old man asked if I was getting ready to go out west since I was shooting at the longest range my club offers. I told him no. He became livid and red in the face while he informed me that he and his son hunted in West Virginia and never sighted their rifles at more than 100

yards. This guy was actually angry at me for simply shooting my rifle at a different distance than he thought suitable.

How much I would have liked to explain to this fellow that I wasn't testing my own ability as I already knew how well I could shoot but wanted to see how well my rifle could at that range. I also wanted to inform him that I usually sighted all my scoped, bolt-action deer rifles at two hundred yards, allowing for a vital zone hit at any distance in between 220 Swift. by simply holding where you want to hit within an inch or two. Assuming an eight inch kill zone, that's not bad.

Since I just shot my last buck at a distance of over 200 yards it wasn't unreasonable to sight in at that distance. Don't they have fields in West Virginia? His son just looked embarrassed for his opinionated father. I told them I was done anyway and they marched down to the with their deer rifles, probably

to shoot all day and still not really be sighted in. Let's check some figures from Hornady's Handbook of Cartridge Reloading.

Shooting my .300 Winchester Magnum and Hornady 165 grain boat tail spire points at 3200 feet per second, a 200 meter zero has the bullet never going higher than 1.6 inches or lower than 7.3 inches at 300 meters. I use the same bullet in .308 Winchester at 2700-2800 fps and the same zero is 2.4 inches at the highest point and no lower than 9.9 inches at 300. Some of you may have bought into this maximum point blank range nonsense, whatever.

When I'm shooting at game I want to know the range exactly past 200 yards as I know the drop and can aim accordingly. Up to 200 yards where most deer are shot I aim dead on and get a good hit. I'm using yards because I can't estimate meters as well, although my range finder can.

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A 6-20X Leupold target scope helped make this one possible. Don't try this with a 4X scope. They are not gospel, anyway. Every rifle is a law unto itself and needs to be shot at different ranges in different conditions to reveal its true accuracy potential. So this old boy and his son probably have sat on the same stump for twenty years and killed a decent buck the first day. But, by the same token, while he doesn't mind spreading his opinions around, maybe we should be more cautious while still telling the truth.

I am willing to bet that these hunters have never seen a ballistic table in their lives. Introducing them to a few facts and figures can be rewarding if handled with respect and care. After all, none of us, including me, knows everything. Maybe I might learn something from them if we could have a rational conversation and leave our biases in the truck.

Printed ballistic tables and computer programs cannot be totally 35 Remington (left) and 6.5x55 Swede (right) are not necessarily picked for accuracy potential but will shoot very well. If there is a winner as most accurate cartridge it will be determined at the benchrest matches, not the game fields. relied upon. Each rifle shoots differently. The old GIGO (Garbage In, Garbage Out) relates to what data is entered.

If your scope is mounted 1.75 inches over the bore line instead of 1.5 inches, or your temperature that day is 65 degrees instead of 80, or the wind is actually hitting you in the face at ten miles an hour instead of five, or you set your chronograph 12 feet from the muzzle instead of 15, you will get skewed results. These programs and tables are helpful, just not gospel. Each rifle must be shot at the different ranges to determine real trajectory.

Even then, it may shoot a little differently under changing conditions. Even professionals sometimes forget such things and start

talking in absolutes. Be careful where this can lead you in a talk with your customer. Since I am a story teller I will share one more. I arrived at my local club's fifty yard range and found two other shooters there before me. Since we have twenty benches on that range this presented no difficulty.

After exchanging pleasantries, they cooled the range so I could hang some targets and we all settled down to shoot. I was shooting a 7mm-08 Remington sporter weight rifle. I wasn't really checking accuracy per se, (actually, I was just there to have a good time and enjoy the weather) but I was "testing" some of my handloads to see if any had any potential. I slipped on a PAST Recoil Pad on my shoulder and fired away. I noticed between firing strings that these guys were looking at me queerly.

I had a short conversation with them and one sneered that if he had to wear a sissy pad he'd stop shooting. He was shooting a lever-

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35 Remington. action .45-70 with factory loads. He proudly displayed his latest target of three shots touching at this range. Pretty good shooting I told him and went about my business. I've said somewhere before I don't pick arguments with people I meet at the range (unless they really piss me off) so I just shrugged. These guys were just typical shooters who had their own opinions and believed that three shot groups translated into one inch at one hundred yards and two inches at two hundred yards and so on.

I would have bet my rifle that if I went with this guy to the two hundred yard range he couldn't duplicate a MOA group in five tries. As far as the "sissy" pad goes it was obvious that these guys didn't understand the fact that recoil is cumulative. Even the light recoil from using a .22-250 Remington during an

extended prairie dog shoot can create a flinch at the end of the day. The more you shoot the more effect it has.

He had probably shot around six rounds; I was planning on shooting many more than that and had also shot at least that much the day before. I could have told him about the torn rotator cuff surgery I was just recovering from and how painful it could be for me to shoot in the first place, or the arthritis my orthopedic surgeon told me she scooped out of my shoulder like sugar on a teaspoon. Why make a man feel foolish just because you can?

If I spent my time in that manner I wouldn't get anything else done due to the plethora of candidates. The point is this man thought his fifty yard group qualified as the end-all accuracy test of his rifle. He probably doesn't shoot deer any further than that. Good for him, but believing that single group trans-

lates 243 Winchester varmint rifle. The little flier may have been my fault. When working these types of rifles here is what to aspire to. A lot of them may not live up to it.

By the way the group is measured outside to outside at 1/2". None of us will ever know everything about it. to unbelievable accuracy out to infinity is an attitude we sometimes encounter when casual shooters come in the shop. You aren't going to change their minds about what accuracy is and a good three round group at fifty yards is more than adequate for this type of rifle.

You're not going to please everybody when it comes to how their rifle will shoot but there are definite techniques that can be used to make almost any rifle shoot better and, hopefully, make it a reliable tool in the field. Next time we'll get into the nitty gritty of trying to get our rifles to shoot as well as we want or expect. AG

MAINTENANCE & REPAIR

What Caliber Is It?

Unmarked or mismarked guns can be hazardous. When buying new guns you can count on them being clearly marked with the caliber or gauge, but the used gun market is full of pitfalls.

BY PAUL MAZAN MAY 2015

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Whether behind the counter of a gunshop or just perusing the aisles of a gun show, you are going to come in contact with a lot of used guns. It may be a gun coming in for repair, a trade in, or just one you have been looking for to add to your accumulation. There are questions you need to ask. When buying anew firearm it will be chambered in the requested caliber and the folks at the factory will have neatly marked both the box and the gun itself with the caliber or gauge it is chambered for.

Unfortunately, once the gun leaves the dealer's hands any number of things can happen to it. It may be rechambered for a wildcat cartridge and still carry the original caliber designation on the barrel. It may have been rebarreled in any number of different calibers without being marked. That is not a safe or professional practice but it does happen.

So, when finding that "bargain of the century," how do you know if the barrel stampings or the seller's claims about the chambering is the actual caliber its really chambered in? It is one of those things we take for granted and until you get bit by that dog you think it is friendly. Usually, there are tip offs that things may not be what they seem. If the barrel is unmarked, ask the dealer or seller how he knows if it is chambered for the round in question.

If he hasn't checked and just took the previous owner's word for it, you should negotiate the right to return the gun if it proves to be something different than advertised. Even if he tells you he checked it, you might want to check it yourself and then, once What's wrong with it? positively identified, mark the barrel to avoid any accidents in the future. Most times the result of chambering a wrong round is more embarrassing than tragic. A .270 fired in your .30-06 won't likely blow the gun up.

It won't hit anything but it sure will expand the case neck and perhaps blow some gas back your way. However, an 8mm Mauser round in a rifle converted to .308 could have an entirely different outcome. You're going to find that .323 bullet quite incompatible with your .308 bore. This stuff happens all the time. Let's make sure it doesn't happen to you. It was laid on something wet and left there. I recently bought a Winchester Model 94 at a real bargain basement price.

The serial number told me it was made in 1956 and the left side of the rifle told me it had been placed down on a wet surface and left there for quite some time. The pits were enormous and rusty. That was the reason it was selling so cheap. Nobody wanted it. To add to the gun's woes, the original .30-30 caliber marking was barely readable on the left side of the barrel and some intrepid wannabe gun guru marked the top of the barrel ".30 Stout Express." I don't pretend to know everything but I had

WHAT CALIBER IS IT? CONTINUED

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30-30 caliber markings are still visible on the barrel. never heard of such an animal. When the dealer took my \$200 offer I knew I was taking a chance. As it turns out I wasn't the only one that had never heard of a ".30 Stout Express." Nobody else in the shooting world had either.

None of the cartridge guides listed it, the Internet gave me all kinds of things called "Express" but none of them had anything to do with "Stout." My initial reaction was that it was probably a .30-30 that once ruined by the massive pitting had simply been remarked with the name of some guy named

Stout and his fantasy cartridge name. To be on the safe side I thought I'd better do a chamber cast. Left is a factory .30-30 case.

Middle is the chamber cast revealing that the rifle has been rechambered to .30-30 Ackley Improved. Right is the fire-formed .30-30 case. Casting the chamber is a relatively simple process. Clean the chamber and plug the bore just ahead of the chamber with a tight fitting cleaning patch and use a low melt alloy called Cerrosafe that melts between 158 and 190 degrees Fahrenheit. I use a lead ladle but at these temperatures you can melt it in most metal containers.

The molten Cerrosafe is carefully poured into the chamber. Once set up it's pushed out from the muzzle with a cleaning rod. Cerrosafe is unquestionably the best media to use for this process because it shrinks slightly when it cools, removing easily from the chamber. Within a half hour it expands back to the original size, giving you a perfect casting of your chamber. Cerrosafe is available from Brownells (#080- 027-050AK) for a half pound ingot at around \$25.

IN THIS CASE THE RESULTING CASTING HAD ME SCRATCHING MY HEAD AND IT TOOK

WHAT CALIBER IS IT? CONTINUED

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a bit for me to identify it. The barrel had been rechambered for the .30-30 Ackley Improved! This wildcat is basically a .30-30 with less taper to the body of the case and a sharp shoulder, increasing case capacity allowing for heavier powder charges and increased velocity with the same bullets.

It also means anew set of loading dies, dedicating some .30-30 cases to be fire formed to the new caliber, and finding loading data for the round as I have not found it commercially available nor is it listed in any of the loading manuals I have. I did find a half dozen recommended loads in P. O. Ackley's Handbook for Shooters and Reloaders Volume I. Suddenly, my "Buy of the Century" pre '64 Winchester 94 with a little rust didn't look so great.

I took 20 rounds of Winchester .30-30 factory ammo to the range and shot it through the gun to fire form the brass. I really didn't expect much accuracy with undersized cases and I sure wasn't disappointed. The targets looked more like a shotgun pattern than That won't win bench rest prizes but works just fine for deer. a rifle group. I'll have to see what happens when I reload the cases and play with some loads and powder to see if I can find a combination this gun likes.

If all else fails, I could simply rebarrel the gun to some boring unimaginative caliber, like maybe, .30-30. The size of the group really bothered me so I closely inspected the crown. It didn't appear to be badly damaged. Just to eliminate a possible cause of the rifle's inaccuracy I decided to recut it. Brownells sells tools to do this job by hand

and I have been successful with their Rifle Muzzle Chamfering Cutters before and employed them again.

My next trip to the range with reloaded fire-formed brass and 150 grain bullets gave me a two-inch 50yard group from the bench using the factory open sights. That was a huge improvement. Although it is not target accuracy this isn't a target rifle. The Winchester 94 was designed to be a medium range hunting rifle and I have noticed over the years that deer are far less critical of pinpoint accuracy than a paper target is. The moral of this story is: When buying used guns, be sure to ask questions.

Know what you are getting yourself into, and always check that the gun is actually chambered for the round it is supposed to be before you shoot it! AG

MILLING

Reader Forum

BY AMERICAN GUNSMITH EDITORS MAY 2015

ORIGINAL PP. 23-24

Remington Hepburn No. 3 I have a Remington Hepburn No. 3 stamped "40.2 1/2" under the barrel that is exposed forward of the forend and stamped ".45-70" next to the serial number of 3008 under the barrel that is covered by the forend. Factory .45-70 cartridges will not chamber in this gun. The round goes in almost all the way, but lacks about a millimeter from going all the way down. The falling block will not clear to allow the block to come up. A caliber gauge in the muzzle measures 0.45.

What is the proper cartridge for this rifle? Ron Beene Murfreesboro, TN The reason the block is getting blocked is due to the fact the cartridge can't be, or isn't being, completely chambered. Remington Hepburn No. 3 rifles were manufactured in sporting, short range, mid range, match, long range, Creedmoor, and military configurations. The sporting, or hunting, version was chambered for a total of 27 different black powder centerfire cartridges. The low-production mid range packed the .38, .40 and .45 centerfires.

The short range (even lower production) housed the .38-40 WCF. The Creedmoor, a relatively few ever produced, fed on the .44-77, .44-90 and .44-100 straight or bottleneck cased centerfire. The match, for short or mid range target shooting, ate a variety of .25, .32, .38 and .40 centerfire ammo during its twenty year production run. The military had a .44-85 chamber. You'll have to make a chamber cast and do some research into cartridge dimensions. Call Remington and ask to get in touch with the Remington Museum.

Provide them with the serial number and details of your rifle. Winchester 1895 Is there a review, write up, or AGI video available for the 1895 Winchester in .30 Government 1906? The Winchester 1895 was a great old gun. Accent on the "old." It

was last produced in 1940 and only one was made that year. The rifle was based on Browning patent #549,345.

Its action was able to withstand the most powerful cartridges of the day and gave birth to the .405 Winchester, considered adequate for the taking of elephant, water buffalo and rhinoceros. We have never done an article on this rifle and you'll have to contact AGI about their coverage. The aforementioned patent will contain abundant information on how the rifle operates.

A copy can be secured online (uspto.gov or google.com/patents) or at nominal cost directly from the US Patent and Trademark Office in Washington, D. C. General information can be viewed or downloaded by entering "Winchester 1895 Rifle" in your browser. 1911 Questions I have been trying to make a 1911 to fire 9mm 40 S&W, and 10mm. In each case the round hits the bottom of the barrel and won't feed except for the last round.

I've tried different magazines, polishing the feed ramp and the bottom part of the barrel, but nothing seems to work. It looks like I have to lower the barrel, but I'm afraid to ruin the frame. All these frames were bought from Sarco and Essex. The ones from Sarco I know are not up to par, but the Essex frame is good quality. Barrels are Swenson. If you cut into the frame you'll wreck the pistol. So don't.

It's true there must be approximately 1/64 to 1/32 inch of space between the bottom of the barrel ramp and the frame. Any material to achieve that has to be removed from the ramp. Simple polishing has little to no effect on feed problems and the lower ramp should be radiused to make it easier for a cartridge to "turn the corner" and enter the chamber. The Bill Henshall lips of the magazines you are using may require adjustment inward or out Be sure to use top quality magazines.

We like Metalform and Tripp Research Cobra best. If you don't have copies of Jerry Kuhnhausen's Colt .45 Automatic: A Shop Manual you should. On a subject not dedicated to your query, we do not know if you presently hold an FFL. We are reasonably certain you are not licensed as an FFL Manufacturer. What you are undertaking could lead to you being classified as a manufacturer by a visiting ATF Inspector. If you intend to keep the resulting pistol as your own you might be in the clear.

If there is any intent to sell it—ever—you risk being in violation of Federal Law. If you want to end up with a multi-caliber pistol while being both certain of its end performance and your continued freedom, contact the American Pistolsmiths Guild (americanpistolsmithsguild.com). Some of its members hold Manufacturer FFLs. Others do not produce enough custom handguns to require they be so classified. Turn the project over to one of the latter two.

Canjar Triggers I have a Winchester 52 with a Canjar Match Trigger installed. The trigger has been set so light that the sear will drop when the bolt is closed if I do not close it slowly. I want to get into match shooting with it but I think this is far too light. I think it is set in ounces not pounds as I can just feel the trigger shoe when it fires. Gregg Hosac Do you have any information on adjusting these triggers?

Canjar went out of business in 2007 and I haven't been able to find any useful information on the Web. If I remove the action from the stock there is an Allen screw with a lock nut available. I think this may be where the pressure is set but before I start twisting screws I wanted to ask someone who might know more than I do. Steven Douglass Ellensburg, WA

READER FORUM CONTINUED

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We have no information on hand but have heard a Keplinger or Moyers trigger, both available from Brownells, is a worthy substitute for the late, lamented Canjar. If that thought turns your tummy, log on to Shooter's Forum (shootersforum.com). Free it is not but joining up gives you access to a plethora of downloads, including one about adjusting Canjar triggers.

Browning Auto-5 Lockup I am a new gunsmith and I have a old Browning Auto-5 (serial number 46808) with a locked up breech block and I can't get the barrel off. I called Browning but they said they didn't give advice over the phone. I have not been able to release the breech block and pull it back to the cocking position so that the barrel can be removed. The locking block latch pin appears to be in the latched position and the bolt release button does not release the bolt.

The bolt may have been released earlier with the barrel removed, which I know should not be done. What might be causing the lockup and how can I fix it? Before going to work on that Auto-5, order in a set of thin Magna-Tip blade bits from Brownells. The narrow screw head slots on the A-5 demand them. This shotgun is a "busy" one with a multitude of small parts. Without having the piece in front of us we can only surmise regarding the cause of your lock up problem.

We don't think your suspicion of a barrel-off bolt release to be a distinct possibility. Its possible occurrence brings forth nasty images of other forms of abuse. As one of the things this old timer at 'smithing would like to know is whether the A-5 you're facing is an old or new model. The latter mentioned has several pages devoted to it alone in a Browning Field Service Manual. Now that we have you really worried, don't be.

You may be in luck and discover the cause to be a protruding pin or weak/broken spring somewhere in the firing mechanism. Equally lucky would be to discover whomever abused the gun initially was way off base in

its reassembly. Full instructions on disassembly of the A-5 appear in The Gun Digest Book of Shotguns Assembly/Disassembly. Follow them to remove the entire firing mechanism from the Phil Martini Remer, MN gun and check on its proper reassembly.

If that fails to uncover the cause, contact Nu-Line Guns (nulineguns.com). They used to be a Browning authorized service center. Ask to speak with Jerry Stevens and let him know we suggested you call. Shop Tools I have been looking on the Internet as well as print publications for sources other than Brownells, Midway, and some other more hobby-related companies for tools for my gunsmithing business. These companies are a fantastic source and but they're honestly my only source.

They can't be the only go-to place in the United States. I'd appreciate any recommendations you may have. Jon L Granteer No one can beat Brownells when it comes to gunsmith-specific tooling. Of course there are other highly sources.

For chamber reamers we like Dave Manson Precision Reamers (mansonreamers.com). For customizing pistols, parts or in total, there's Bill Laughridge at Cylinder & Slide (cylinder-slide.com), or Jim Clark Jr. at Clark Custom Guns (clarkcustomguns.com). For revolvers, it's usually Ron Power at Power Custom (powercustom.com). Seek out Grainger Industrial Supply (grainger.com). In the huge inventory department, there is MSC Industrial Supply (mscdirect.com). Their catalog fills a four-inch thick three-ring binder and has everything from six-foot lengths of cold rolled steel to jeweler's screwdriver sets.

Check into machine tools with Grizzly Industrial (grizzly.com), or contact Blue Ridge Machinery (blueridgemachinery.com), if you're aiming for fatherland-quality lathes, drilling/milling machines, and the like. As for coatings, the best we've worked with are Dura Coat (lauerweaponry.com), G

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