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INSIDE THE ARCHIVE

RUGER ULTIMATE BULLSEYE UPGRADE, PART ONE

CLEAN SHOT • 9MM FLOBERT SHOTGUN • POTENTIAL LIABILITY OF THE PROFESSIONAL GUNSMITH • AFTERMARKET PIS...

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 167

DIGITAL ARCHIVE EDITION

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IN THIS ISSUE

Contents

A complete guide to the searchable editorial work preserved from November 2017.

-
- | | |
|--|--|
| 2 Clean Shot
AMERICAN GUNSMITH EDITORS • ORIGINAL PAGES 2 | 3 Ruger Ultimate Bullseye Upgrade, Part One
DAVID ALLEN DUMEAH • ORIGINAL PAGES 3-8 |
|--|--|
-
- | | |
|--|---|
| 9 9mm Flobert Shotgun
SERGEY LYALKO • ORIGINAL PAGES 9-11 | 12 Potential Liability Of The Professional Gunsmith
JOSEPH REICHERT • ORIGINAL PAGES 12-15 |
|--|---|
-
- | | |
|--|--|
| 16 Aftermarket Pistol Barrels
ROBERT K. CAMPBELL • ORIGINAL PAGES 16-19 | 20 New AR-15 Triggers
ROBERT K. CAMPBELL • ORIGINAL PAGES 20-23 |
|--|--|
-
- | | |
|--|--|
| 24 Reader Forum
AMERICAN GUNSMITH EDITORS • ORIGINAL PAGES 24 | |
|--|--|

MAINTENANCE & REPAIR

Clean Shot

BY AMERICAN GUNSMITH EDITORS NOVEMBER 2017

ORIGINAL PP. 2

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Clean Shot is an automatic bore cleaning device for shotguns. Created by Huntogo Limited (Huntogold.com), Clean Shot is a first of its kind shoot-through bore cleaning cartridge, being a fast, efficient, and convenient cleaning field cleaning method. A Clean Shot cartridge is chambered and employed in the same manner as firing a shotshell.

The high-velocity bore cleaning device field cleans the bore in an instant, using a patented material that applies approximately 9,600 psi of outward pressure to scrub, trap particles, and wipe the bore clean. It works in the field, range, or anywhere a shotgun can safely be fired, removing fouling, plastics and other bore-eating contaminants in less than a second. Founded by Curt Whitworth, the product is based on three U. S. patents.

The propellants used are highly oxidized and formulated to have a very low carbon composition in their chemical chain. Any residual that may be left in the bore is extremely minimal, thus not fouling like a shot-

shell normally would. While the payload is a cleaning composition and not a wad or shot, Clean Shot must be handled and used as live ammunition. Compared to normal cleaning, Clean Shot removes more fouling than a patch after several passes.

The cleaner is safe to use on all smooth and rifled bores for repeated uses. When Huntogo Limited first announced Clean Shot they used [Fire Funder.com](http://FireFunder.com) new crowdfunding platform dedicated to shooting industry products and services—and it was their first crowd-funded product. Huntogo Limited began by launching the 12 gauge model for Clean Shot which uses a standard shotgun hull and is manufactured using the same process and standards as ammunition currently manufactured by the OEM brands today.

They are in mid-production of a large volume die for this. The company is working to release 20 and 28 gauges, as well as .410 next year. They are also actively working on a version for 9x19mm and 5.56x45mm.

PEOPLE & COMPANIES

Ruger Ultimate Bullseye Upgrade, Part One

From workhorse to thoroughbred, the prolific and popular Ruger Mark I and II rimfire pistols are readily converted into top Bullseye performers.

BY DAVID ALLEN DUMEAH NOVEMBER 2017

ORIGINAL PP. 3-8

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Several years ago while plinking at our local sportsman's club, I ran into fellow shooters who competed in NRA Precision Pistol, often known simply as Bullseye shooting. They invited me to join the sport with them and explained to me the rigors of what it took to play the game. Not really having a Bullseye-grade pistol, I didn't know where to start. I went to a local old-time gun shop and talked to the owner behind the counter.

He recommended something like a Hammerli, S&W 41, Walther, High Standard, Benelli, or a Pardini. Having recently purchased a Ruger Standard from my pastor for \$150, I asked if it could be suitable and he remarked that it was well within the capabilities of shooting Bullseye, however, its trigger system would make it more difficult to be a strong competitive pistol. That said, the Pencil or bull barrel, I have yet to see any definitive effects on scores. My journey started.

Since then, I have successfully built dozens of Rugers that I see weekly on our Bullseye line in the hands of the top shooters com-

peting with great success. I must preface this presentation with the caution that these pistols when completed are not picnic plinkers for the whole family to play with. I cannot repeat that strongly enough. When finished, these pistols will easily keep up with the most expensive European-made models. You will see throughout that this requires a tremendous amount of attention to detail.

Some of it is seemingly quite minor, however, all of the "itty bittys" can add up to an "I gotcha." There are three serious disclaimers. First, before undertaking any procedures in the following text, it is your responsibility to have a complete working knowledge of the firearm and its fire control system. Second, you are responsible for all the work that you perform. This article is for educational purposes only and no liabilities are implied or expressed.

Finally, the techniques and procedures I present are mine alone and may not work for you. It is up to you, your judgement, and your clients to determine what is best and most appropriate. Frame Types It is al-

ways advisable to make sure the Ruger model that you have is indeed in an A-100 frame. The easiest way to identify the frame is to see which side the magazine button is on. It should be on the left side.

While it is possible to upgrade a model A-54 frame (which has the magazine button on the right-hand side), those models are very difficult to get target grips for or much else in the way of aftermarket goodies. A-100 frames became available in late 1970. Mark I pistols manufactured after then and all Mark II pistols should be A-100 frames. This information is intended for Ruger MK I and II pistols only. The Ruger 22/45 is a polymer framed pistol and is too flexible for safe upgrade.

The MK III, though a fine pistol, has internal passive safety mechanisms that must be preserved and tend to limit the final performance level. Unfortunately, the new MK IV has a magazine disconnect like the MK III predecessor. I have not had opportunity to engage a serious look at the MK IV, however, passive magazine safeties must, by law, be fully func-

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A copy of a factory-drilled barrel is used as a template. tional when they leave your shop, so be forewarned. The MK I and MK II platforms avoid this area of concern. After establishing that you have an A-100 frame, make sure the firearm is clear and empty with the magazine out of the gun. I will choose to start with the upper, or the barrel receiver assembly as it's known. This is the part of the pistol with the serial number on it.

Check to make sure that the gun is clear and empty again and insert a dummy snap cap for a dry fire. This can be done with an empty, fired case, a commercial snap cap such as from Tipton, or an appropriately-sized yellow wall anchor such as from Hillman Fasteners available from a hardware store at about \$0.06 each. Ruger does claim dry firing does not hurt this rimfire pistol, however, why take the chance? I will list manufacturer part numbers with the Mark I first, followed by the Mark II.

Unfortunately, Ruger rimfire pistols are much maligned for difficulty in disassembly and reassembly for routine cleaning. This is unfortunate, as once successfully executed, it is an extremely easy firearm to disassemble and reassemble. One must take into consideration one part I refer to as the "devil's strut," which is the hammer strut (A10 or A01000) that hangs off the hammer proper.

With that in mind and while holding the dry-fired pistol in your off hand, pull out mainspring housing latch (A7 or A00700) out of the back of the grip and use it as a handle to pull the entire assembly down and out of the gun with your strong hand. Set this assembly aside but not far as the mainspring housing latch can be used as a handy tool in the successful disassembly and reassembly of the pistol. The bolt assembly is ready to come out.

I have found it most advantageous to retain the bolt in the closed position, rotate the muzzle up, and shake the pistol downward stoutly. This tends to keep the "devil's strut" from interfering with the sear spring stop pin (A26- 3 or A02603). The hammer should rotate rearward and allow the bolt to slide out the rear. If for some reason it stops, it's because the tip of the "devil's strut" has stubbed out on the sear spring stop pin that retains the tail of the sear spring.

No problem, as a tool capable of freeing the hammer is the mainspring housing latch. If set at 90 degrees to the mainspring housing assembly, it makes a pretty handy tool for moving the hammer forward enough to free the strut. The strut should clear the cross pin, allow the hammer to rotate completely reward, and the bolt and dummy cap should slide right out. With the bolt in hand, the gun can be broken down.

Go to a padded area, hold the muzzle up in one hand and a soft mallet in the other (a clean hockey puck works really well), and tap against the front of the frame assembly to move the body of the gun away from the barreled receiver. The frame will fall off, though some are much tighter than others. At this point you have a cylindrical receiver attached to the barrel, a bolt with all of its parts on board, and the lower with fire control and magazine assemblies together, along with the mainspring housing assembly.

Next is the barrel/receiver assembly. If yours is not drilled from the factory (many are not) I recommend obtaining a genuine Ruger three-hole scope mount and line it up as if it were factory drilled with the 6-48 mounting screws. I made a template from a copy of a factory drilled barrel and use that. This also allows the original rear sight assembly to stay in place. To do this accurately, remove the rear sight and use the rear sight dovetail cut out as the square area of the gun to find top dead center.

After determining TDC, center punch the last hole to the rear with a spring-loaded punch. Drill and tap that hole, mount the rail, then center punch, drill, and tap the next hole. Remount the rail and repeat for the last hole. If all has gone well, the rail is indeed at TDC and there are no stresses between the mounting screws. With the rail in place, the original sights look right down the middle of the rail screws. I have had problems in the past with rails

RUGER ULTIMATE BULLSEYE UPGRADE, PART ONE CONTINUED

ORIGINAL PAGE 5

shooting loose in a couple of years of use. Bullseye shooters don't seem to understand this is common and it is their responsibility to check these things routinely. I always ask if they ever intend to remove the rail and if the answer is no, I Acra-Bed the rail and apply blue Loctite 242 on the screws to attach it to the barreled receiver. This seems to end the problem of loose rails.

As a last and final step on the barrel receiver assembly, I borescope the bore and the chamber because I generally find it necessary to slightly radius where the feed ramp enters the chamber with the lightest touch of a Cratex buff. Working Internals Moving on the bolt itself, it has a lot of room to make things better. Remove the recoil spring assembly from the top of the bolt. I generally pull everything out, including the extractor which itself can really be a nuisance.

To remove the extractor, first remove the firing pin stop (A35-Bor A03500) running left to right. Some bolts have the extractor plunger hole drilled all the way through to the firing pin stop hole and some do not. After removing the firing pin stop, remove the firing pin (A13 or KA01300), rebound spring (A39-1 or A20000), and rebound spring support (A39 or A03900). I then attempt to remove the extractor (A22 or KA02200), extractor plunger (A25-Jor A02510), and extractor spring (A25-J1 or KA20300).

Putting a small screwdriver behind the shoulder of the extractor plunger and pulling it rearward should reveal the tail coming through the hole where the firing pin stop resides. This will actually become a handy port for cleaning later. I use a very small jeweler's screwdriver to catch the shoulder of the extractor plunger and pull it back as far and as hard as I can as I try to lift the extractor itself out of the bolt. The extractor should lift straight out to the side of the bolt.

The plunger and spring are pretty cooperative and generally don't try to get away. However, be prepared should this not be the case. I then begin work on the extractor itself using a small, flat surface plate with wet or dry sandpaper for finish work. 600-grit sandpaper with some quality stoning oil produces good results. I do both sides of the extractor, making sure that any burrs or uneven edges are gone, and finish with a red India stone to lightly radius the edges.

Then, I sharpen the extractor hook tip and bevel the bottom portion of the hook and inside corner. These pistols feed from a magazine straight up and need to allow the rim of the case to slide between the extractor hook and the bolt face. It is important that this transition is smooth. I realize that many will argue the extractor is only valuable in removing live case from a charged chamber. While I cannot argue that point, I have found that a tight extractor greatly reduces the number of alibis.

Following this, I take a thinned popsicle stick and wrap the same oiled 600-grit paper around it, running that into the extractor's channel. It is surprising how sharp the burrs can be in there. Next is the firing pin. I lay it sideways on 600-grit paper or flat stone and remove any irregularities on both sides, followed by an India stone to radius all the edges. After that is completed I wash everything down. I'm a big fan of Ed's Red and I'm pretty sure everyone knows what that is.

Fortunately, putting the extractor back in is really not as difficult as getting it out. Press inward and to the rear and it should snap in underneath the extractor plunger. I usually examine the rebound spring, which has a tendency to be pretty stiff. I replace the mainspring with a softer one and need to ensure solid detonation on rimfire cartridges. Since these pistols will not be used for casual recreational purposes, our

concerns of firing pin detonation from muzzle impact should be considered minimal.

The rules at our matches and most others are strict about safe gun handling, so I choose to keep the tension on the rebound spring minimal but definitely present. I generally trim a coil or two off the rebound spring and leave the rebound spring support alone. I then reassemble the rebound spring support to rebound spring and the firing pin to the bolt. There should be some resistance to the firing pin and it should return to the unfired position with finger pressure after releasing it.

Despite being lightened, I have never seen any type of marks on ejected, unfired live cases after the bolt has been driven home. I then push the firing pin slightly forward and replace the firing pin stop. I do not change the spring in the recoil spring assembly (A38-3 or KA-57) though I do pick which side of the yoke is going to be the upper portion and which part is going to be the lower portion. This yoke would be the rearmost "fork" of the recoil spring assembly that abuts the bolt stop pin (A1 or A00100).

The front semicircle that engages the slot in the bolt proper rotates 360 degrees and doesn't have a specific orientation. Here, I remove some of the metal at the rivet point of the yoke. With a small relief at this point, installing the mainspring housing assembly along with the bolt stop pin up through the frame and bolt will be much easier on final installation. Install the recoil spring assembly into the bolt. Next up is the lower grip assembly, which for some reason does not have a serial number on it.

This is where the gentleman friend behind the counter was correct about the fire and control mechanisms and problems in the Ruger series. Our objective here is to remove as much "out of tolerance" as possible. To this end, there will be very few things that we don't get involved in.

RUGER ULTIMATE BULLSEYE UPGRADE, PART ONE CONTINUED

ORIGINAL PAGE 6

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Trigger Look at the relationship between the trigger (A12 or A01200), the disconnect assembly (A11 or KA011), the sear (A19 or A019010, the hammer (A18 or A01800), and the safety (ASCor AN53-100) you're starting with. As you have just a lower in your hand, replace the mainspring housing assembly. This will have the bolt stop pin sticking up through the hole in the back of the frame.

You will need to align the hammer ("devil") strut Just go slow and let the carbide find it's way. with the mainspring plunger (A25- 1 or KA02509). When the hammer is cocked, there will be pressure against the hammer as it engages the sear (A19 or A01901). This will allow you to see what your starting point will be when we get to this section. Not all

Rugers are the same. Cock the hammer and allow the sear to engage the hammer notch. This is all quite visible from the top.

Put the safety in the "on" position, guard the hammer with your off hand in case it should release. Pull the trigger firmly and see how much movement there is between the sear itself and the hammer hook with the safety on. Unless it is unlike any Ruger I have ever seen before, there will be a great deal of movement of the sear and the hammer hook, yet it will not release the hammer. The sear will creep back under the hammer hook when releasing the trigger, common for stock Rugers.

We'll look at this in detail later but I bring it up because you'll be removing many of these parts and need to see where the starting point is and what has to be done to turn this into a Bullseye-ready pistol. Proceed once you have accessed and established the amount of excess tolerance in your pistol's fire control system. I begin at the very front end of the lower where the trigger pivot pin (A34 or A03400) goes through.

There will be a slightly different procedure Mark IIs as they have a bolt lock stop and a slightly different trigger pivot pin. Check your Ruger's trigger to find if the left-to-right wobble of the trigger in the frame will be excessive. This isn't an issue for most people but it may

RUGER ULTIMATE BULLSEYE UPGRADE, PART ONE CONTINUED

ORIGINAL PAGE 7

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be an issue for a Bullseye shooter. The main goal is making sure every trigger pull and reset is as identical as possible. Achieve a good fit by removing the trigger (A12 or A01200) and hammer pivot pin (A26-5 or A02605). Then remove the safety, hammer assembly, hammer bushing (A26-E or A02505). Be careful not to allow the safety detent plunger (A02511) or the safety detent spring (A02000) to fall out of the safety assembly. The MK I uses the same parts but are not shown in its exploded view.

MK I and MK II safety bodies are not interchangeable due to the differing bolt lock. Dotted lines indicate bends. The sear will flop rearward and relax. Move the disconnecter assembly (A11 or KA011) upward, freeing the trigger spring plunger (A25 or A02508) and trigger spring (A34-2 or A20400). The disconnecter assembly is still

trapped by the trigger. On the MK I series, remove the trigger pivot pin (A34) by removing the tiny trigger pivot lock washer (A34-1).

This isn't fun but you won't likely need the lock washer again as anew "oversized" trigger pivot pin should provide a good interference fit to the frame on assembly. On MK IIs, depress the trigger pivot retainer. You can install an aftermarket trigger now. Most of them come with preand post-travel stops, however, I've found the holes there to be excessive due to manufacturing tolerances. I use factory trigger drill preand posttravel stops myself.

The post-travel stop is straightforward, made by drilling a centered #43 hole and tapping it out with a 4-40 tap. The only tricky part is drilling the pre-travel screw. I secure the trigger in a drill press vise, using a carbide #43 drill bit (they are sharp and stiff) to drill at an angle through the front corner of the trig-

ger, being careful not to run into the trigger pin hole, then tapping to 4-40. This sounds much more difficult than it is.

I find 4-40 set screws of various lengths at our local hardware in the "Hillman Fastener" section. This provides a trigger that I know will fit and overtravel adjustments that I can work with. The part that really makes the difference is the trigger axle pin as this can cause excessive slop between the trigger and pivot pin as (KA 04200) to free up the trigger pivot pin (A03400). Its removal will free the trigger and bolt stop (AN-37) as well as the disconnecter assembly.. well as between the frame.

I have found using the largest gauge pin that just fits through is a 0.1575" minus, provided it's perfectly round and well finished. It fits factory triggers well and tends to be a little too large for the frame, developing a nice interference fit when finally in-

RUGER ULTIMATE BULLSEYE UPGRADE, PART ONE CONTINUED

ORIGINAL PAGE 8

stalled. I am currently experimenting with thin shims on these upgrades but cannot accurately report on that yet. Moving on to the parts of the trigger, I chuck up and polish the trigger spring plunger. I buff the inside of the trigger spring plunger hole in the trigger with a small buff in my Dremel tool and install a Wolff reducedpower trigger return spring. I replace the disconnect assembly with the reinforced CNC machined unit from Volquartsen (#VC2DN).

While not inexpensive, these are extremely effective in reducing disconnect flex, which is quite detectable during a slow-fire stage of fire and is a real deal maker when it comes to the final finished product. The only thing I do to this Volquartsen part is smooth the outboard side with the 600 paper and break any sharp edges. I then take a buff in my Dremel tool and buff the inside of the frame proper where the disconnect resides to a high shine.

As we leave the front portion of the lower, let's look at the essential piece that makes a Ruger an effective Bullseye pistol: A dirt shield. While a relatively unusual piece of thin material, I have seen pieces of aluminum beverage cans used as well as other thin metals. I fabricate a dirt shield that keeps the products of combustion and other debris from falling down into the trigger spring plunger assembly. This area is one of the major downfalls of using a Ruger as a Bullseye pistol and protecting it is a must.

To construct a shield, I use a piece of 0.005 stainless steel shim stock and trim a tab and shield piece that fits between the barrel and lower assembly, sealing out dirt from the top of the trigger and trigger spring plunger assembly relatively well. I generally fit these as I go so there really aren't any specific dimensions as to how to make them. The photographs here demonstrate how I make mine. The shield is trapped by the interference fit created by the front lower lug to the barrel.

If it is installed correctly, the left-to-right bend in the shield will be in line with the rearmost edge of the feed ramp. Gage Pins Moving to the rear, when I do a "full monty" job I replace the hammer pivot pin and the sear pivot pin (A26-8 or A02601) with "oversized" selected gage pins. When working with the Mark IIs, it is not possible to replace the hammer pivot pin as it has ahead on it that holds part of the bolt stop assembly in place when the grip is installed.

These axles are fitted as large as possible and still run smoothly in the sear and hammer bushing. A Ruger factory trigger generally will take a 0.1575- gage pin as a very good fit. Volquartsen triggers have larger axle pivot holes and must be tried for fit. With gage pins for sears, OEM sears usually fit well with 0.128- gage pins and Majestic Arms sears usually fit well with 0.127+ gage pins.

For hammer bushings (applicable on MK I series) Tandemkross III will usually take 0.157- gage pins, OEM MK III will usually take 0.157+ gage pins, OEM MK I and MK II usually take 0.1575+ or 0.158- gage pins. Majestic Arms will usually take 0.158+ gage pins. Getting to the meat of the matter, the sear, hammer, and safety arrangement on the Ruger series will require very careful adjustment.

Anyone attempting to do a Bullseye-grade trigger job on a Mark I or II pistol must realize how the fire control system and safety works. I find the lack of concern with safety in aftermarket parts to be upsetting. Ruger's safety design is excellent, however, it must be closely monitored to make sure it is working as designed. While looking at your assembly after taking the barrel off, there is a disconnect assembly connecting the trigger and the sear.

Cocking the hammer causes the sear to fall into the hammer notch and the hammer is retained from going forward. If the disconnect is in the down position, activating a trigger does nothing. If the trigger bar is in

the up position it will engage the sear and the hammer will be allowed to fall. The safety on this design is actually a hook that goes over the front left edge of the sear and locks it mechanically into the hammer notch..

I would be surprised if you didn't see some substantial movement in the sear/hammer interface earlier. I cannot emphasize proper operation of this arrangement enough. You are going to remove metal from the sear contact surfaces but maintain positive engagement. This is where the rubber meets the road. I cut my own sears using a Power Custom Series One stoning jig.

After setting the stoning fixture to match the angle of the sear that came out of the gun, I reduce that angle in very minor amounts until I get a trigger pull I am happy with. The engagement must remain positive. As a final way to smooth this up and maintain a great deal of surface area while not having it be detectable is to use a white ceramic stone and quite a bit of elbow grease to finish the engagement surface of the sear proper to a mirror-like shine.

Do not attempt to use a buff as a shortcut as the sear edges must be maintained as sharp and square. The white ceramic stone will do the job, it just requires patience and the aforementioned elbow grease. It doesn't really remove metal as much as it really improves surface quality. I do not alter the cut in the hammer notch. If you are not comfortable or do not have the tooling to recut your sears consistently, buy aftermarket matched sets.

Volquartsen and Majestic Arms make very nice sets of match-grade sears and hammers.. Whether using original or aftermarket parts, polish the tip of the hammer strut. This strut is frequently poorly finished and benefits from a high polish on the radius tip. Next time we will go into complete detail as to how to accomplish final result of creating a Bullseyegrade Ruger. AG

SHOTGUNS

9mm Flobert Shotgun

Old guns with eroded chambers may be repaired to shoot again. Here's how I brought an old Flobert shotgun back.

BY SERGEY LYALKO NOVEMBER 2017

ORIGINAL PP. 9-11

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The first rimfire metallic cartridge appeared in 1845 invented by Louis Nicolas Auguste Flobert of France. His cartridge consisted of 6mm percussion cap with a small lead ball inserted in its throat. It was powered solely by the fulminate of mercury in the cap with no powder as a propellant. In first trials, the rim was just a small bulge at the rear part of the cap. However, the rim quickly obtained its more modern shape of a thin, round “washer” around the bottom of the cap, which greatly improved chambering.

While Flobert's invention would lead to the rimfire cartridges still in wide use today, it wasn't the first integral metallic cartridge in the history of firearms. By “integral” we mean a cartridge consisting of the primer, powder, and bullet held together in a case for use in a breech-loading firearm. The first one was developed Belgium was major manufacturer of Flobert guns.

The Flobert name became common and applies to a number of different rimfire guns chambered in an assortment of calibers. in Paris in 1808 by Swiss gunsmith Jean Samuel Pauly and his French gunsmith associate, François Prélat. Their cartridges were “needle activated” and a more practical pinfire cartridge design would be patented by French gunsmith Casimir Lefauchaux in 1836. So, if not so revolutionary new, what made Flobert's little cartridge so important?

It was the first rimfire round, which outlived needle/ pin-fired designs, but that is not of primary importance. What really helped Flobert's rimfire take off was that it was designed specifically for indoor shooting, which is why guns chambered for this early rimfire are often called gallery, saloon, or parlor guns. The ease of indoor use proved critical.

Shooting competitions have always been popular among knowledgeable military and civilian marksmen but conducted at full distance requires full-power firearms and lots of real estate. During Flobert's time, such guns for competition had a big bores (mostly muzzle-loaders) and were loaded with a good portion of a black powder. That's a lot of lead, smoke, and noise. Such practice was—and still can be—quite expensive. Besides, the amount of smoke was not conducive for indoor fun.

Therefore, the appearance of the gallery gun solved several problems at once—reduced price, reduced smoke clouds, and enabling practicing at home (or, rather, at the castle.) Wealthy competitive shooters normally had at least two identical target guns—one of a full/high power and another a gallery Flobert gun. They were identical in all features—weight, trigger mechanism, sights, and stock—except for the caliber.

9MM FLOBERT SHOTGUN CONTINUED

ORIGINAL PAGE 10

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The scratches show extrusion of the just-fired case during the extraction. On the wall of my office I have a German gallery gun from around 1860. Its caliber is 4mm and it shoots Flobert cartridges. I always wonder where its big-bore brother might be.

These German target rifles have quite figured stocks and often are called stützen (short rifle.) Though the first Flobert cartridges were of 6mm with the sketch here shows the reamer dimensions along with the corresponding blank turned out of drill rod. no powder, such names as “Flobert gun” or “Flobert cartridge” quickly became household names attributed to different rimfire guns and ammunition of small calibers ranging from 4mm to 9mm, including those rounds loaded with powder.

Numerous Flobert guns of those calibers were made in Europe between 1850 and 1915. Despite being a French design, these guns were made in Germany, Spain, and mostly Belgium. All these guns used either black powder or Flobert caps, both of which were quite corrosive. As a result, many of these guns surviving today are damaged by corrosion. This article is about a Belgian-made Flobert 9mm shotgun with a chamber corroded to the extent that extraction of the fired case became problematic.

Before discussing the actual problem, note that some Flobert ammunition, including 9mm shotshells for this gun, are still manufactured. Fiocchi, for example, still makes 9mm rimfire shotshells loaded with #8 shot. The Problem There are two common types of

damage to the chamber of the firearm preventing normal extraction. One is bulging and the other is erosion. The first is a legitimate result of heavy usage of the firearm as multiple pressure impulses expand the chamber, creating a bulge in its weakest spot.

When it occurs, this typically happens around a third of the way in from the breech. The second is a result of corrosion and loss of metal inside the chamber. These very differently obtained damages can create an identical problem for the extraction of the fired case because of cavities formed inside the chamber, regardless of which way they occur. Dur-

9MM FLOBERT SHOTGUN CONTINUED

ORIGINAL PAGE 11

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Milling the flutes requires some accuracy but is not different from any other milling job. Excessive solder makes sure that all gaps are filled in. In firing, the case expands into these cavities and during extraction it needs to squeeze to a smaller size in order to be removed. I call this “chamber bottleneck” and it exerts great effort on the extractor and casing itself. Basically, this is a form of extrusion and it often leaves marks on the fired case.

The tension related with this extraction makes it physically difficult and can force the extractor to slip from the rim. Then the shooter has a real inconvenience. My customer, the owner of this 9mm shotgun, wanted to shoot it again and had large amounts of these 9mm shotshells. Inspection revealed the gun needed a new chamber. New Chamber, Old Flobert Inserts, liners, sub-caliber tubes, chamber mates, and the like have been well known and used for centuries.

Some of these devices are temporary while others are permanent. In the case of this Flobert shotgun, we need a permanent, new chamber. The old, damaged chamber had to be reamed out and an insert with new chamber needed to be fabricated, soldered inside, and chambered for the 9mm shotshell. Pretty

easy project, however, I faced one obstacle: There is no available chamber reamer for this shell. I looked everywhere and none were to be found.

I recall a conversation with my apprentice when he asked me how long one should be an apprentice. I replied that in my time in European apprenticeship would normally take several years for learning how to make chamber reamers, heat treat steel, make springs, solder barrels, mix rusting solutions, make tools, and so on. However, with all the tools that are readily available commercially, apprenticeship is much shorter—just push a button on the Brownells website and you are tooled up. Not in this case.

Lets go step-by-step. First, removing the old chamber requires a wellcentered cutter. The diameter of this reamer is not critical since the fit of the insert into the breech should be tight so that the shot pressure is supported primarily by the barrel. I used a 5/8" counter-bore reamer with a pilot hole. The pilot needs to be quite long to reach the main bore through the chamber and be very close to the bore diameter. I performed this reaming with a lathe.

Making a reamer requires precision dimensions, a good hi-carbon steel rod, precision turning, milling flutes, hardening/tempering, and sharpening. The major steps I used to make a 9mm shotgun reamer started with a sketch with the reamer dimensions and a corresponding blank turned out of drill rod. From there, I milled six straight flutes. Heat treatment is usual and performed the same as one would treat a spring, but tempered to a bit harder condition.

Sharpening needs to be accurate for providing smooth cutting without deep circular marks, otherwise the new chamber would not be any better than the old one. Preparation of the insert for the new chamber did not present any problems being a simple tube. The front end was straight so as to properly engage with the bottom of the rimmed tunnel. The chamber was then reamed into the soldered insert. After some cleaning and modifying the extractor, the new chamber was complete.

Once the chamber reamer was made, soldering and cutting the chamber was no problem. With a new chamber, the Flobert shotgun was restored and ready for my customer to shoot again. AG

FROM THE ARCHIVE

Potential Liability Of The Professional Gunsmith

A candid assessment of your business operations may reduce your risk of a lawsuit and can lower insurance costs.

BY JOSEPH REICHERT NOVEMBER 2017

ORIGINAL PP. 12-15

I have been licensed to practice law for almost four decades and have spent more than 27 years engaged in defending clients against claims for negligence, products liability, and worker's compensation. These cases were entrusted to me by the insurance companies which provide coverage to my clients. Most of these insureds operate small businesses, though I occasionally provided representation to national manufacturing concerns.

Unlike most of my fellow practitioners, I have represented gunsmiths in litigation arising out of their business operations. My work on behalf of gunsmiths has been infrequent, probably due to the fact that the number of gunsmiths is relatively small compared to the other types of potential defendants, such as transportation companies, construction contractors, and appliance manufacturers.

In my particular case, my gunsmith clients were not sued by their customers for faulty work on firearms, but were the target of claims arising out of general activities one would find in any business enterprise. Later in this article, I will explain how the circumstances of the gunsmithing trade can converge to enhance the risk attached to those activities. Bear in mind that this article contains general observations and advice, and is not intended to serve as a substitute for consultation with your own attorney.

With that said, I believe that you will probably find it useful to discuss some of the ideas presented in this article with your own lawyer and with your insurance agent and insurance carrier. I have written this in the hope that it will provide you

with some useful practical ideas, help you avoid suits, and perhaps assist you in securing a meaningful reduction of the premiums you pay for business related insurance.

I am an avid student of firearms technology and gun manufacturing and my interest in shooting, coupled with my legal background, eventually caused me to ponder the legal risks attendant on the gunsmithing profession. After partially retiring from law and greatly reducing my caseload, I found the time to investigate this issue. This article summarizes my findings.

The results of my inquiry were a little surprising to me, probably because my point of view was unduly influenced by the high profile, publicity-driven lawsuits brought against the firearms trade by interest groups dedicated to the elimination of private gun ownership. I started out with the impression that the greatest area of risk would lie in activity of repairing and modifying guns but the facts I uncovered forced me to adopt a different view.

This is not to say that you are immune from ruinous lawsuits based on the claim that you negligently repaired or modified a firearm, causing injury to a shooter or bystander. As a prudent business owner, you absolutely must purchase insurance to protect yourself against that risk. However, after careful inquiry I have concluded that you are at greater risk of being sued for reasons other than faulty workmanship on firearms.

For example, when purchasing insurance, do not neglect the potential of lawsuits based on "premises liability" claims. The

term covers such things as suits based on the allegation that a customer slipped and injured himself due to a defect in the floor of your shop or that a client was injured when an improperly-installed shelf fell on him.

These claims may not generate the huge monetary award that could arise if a rifle fails and sends metal into a customer's face, but slip and fall claims are much more frequent and the cost of defending them is substantial. My initial foray into this subject was very much conditioned by my habits.

I logged into my favorite legal research database and entered search terms which I thought likely to bring up any lawsuits in which claims were made against gunsmiths for faulty repair of guns or dangerous modifications to them. These results were not what I expected, but I later considered that research services of the sort I use to locate legally authoritative decisions are mainly directed at the opinions of appellate courts.

In most instances a case must be litigated completely in the trial court before it gets to appeal and the legal research services to which I subscribe are aimed at bringing me only the results of appeal proceedings. The vast majority of litigation is settled before trial and I could not accurately determine the frequency of lawsuits against gunsmiths, nor the basis for them, by searching the decisions of appellate courts.

Not only is it impossible to assess the types of suits being filed by looking at the output of the higher courts but the practice of looking only at cases which become public will

POTENTIAL LIABILITY OF THE PROFESSIONAL GUNSMITH CONTINUED

ORIGINAL PAGE 13

guarantee that an investigator never sees those matters which are settled before a suit has even been filed. An even more inaccurate result will be obtained by relying upon press coverage of legal cases. It is important to bear in mind that the media seeks out the most outrageous results the legal system generates, because outrageous sells.

I find that reporters usually fail to provide truthful follow-up on the cases they report, often omitting to reveal that shockingly lopsided outcomes are later overturned by higher courts. After searching for an effective way of assessing these risks, it finally occurred to me that I could use my contacts in the insurance industry to find out how insurers assess the liability dangers faced by gunsmiths.

All the gunsmiths I know are covered by liability policies and the premiums exacted from them are based upon the calculations of the insurance professionals known as underwriters. Insurance underwriters determine whether to provide insurance coverage and on what terms. They evaluate insurance applications and determine coverage amounts and premiums.

Most importantly for my purposes, their calculations are based upon the insurance industry's experience in covering the risks incident to each category of enterprise it insures. To make a profit from insuring gunsmiths, an insurance company must accurately quantify the risk arising from every category of activity in which the gunsmith engages, and charge a profitable premium based upon those calculations. It is my good fortune to know some very patient insurance underwriters.

Most of what I learned is the result of their assistance to me, not the result of my own familiarity with underwriting practices.

Before going further, I think you will find it helpful if I provide a short explanation of what insurers mean by "risk" because it is under this label that they attempt to quantify what most of us call "bad luck." There

are many highly technical explanations of this term but all of them come down to the same thing: For an insurer, the amount of risk associated with an activity is the aggregate amount of money that the company predicts it will have to pay out on behalf of a person engaging in that activity.

This prediction is largely based upon accumulated data for losses related to that particular area of activity but it can be adjusted for certain individual factors peculiar to the person or corporation insured. For example, your automobile insurer can predict with high accuracy just how much it will pay out in a given year on behalf of all the drivers it insures but your premium will increase dramatically when your sixteen year old son gets a license and is added to your policy.

The company keeps statistical records which prove that teenage males cause far more losses than their middle aged parents. Applying this concept of risk to a gunsmithing business, an insurer may conclude that the risk of insuring you for faulty repair of a firearm is lower than the risk presented by the possibility of injury to your employees. For example, let us assume that in any ten year time period, a business has eleven claims.

One claim arises out of injury to a shooter due to gun failure and the insurer's payout is \$100,000.00. The other ten are back injuries to employees caused by improper lifting and negligent use of machine tools, at \$12,000.00 per claim, producing an aggregate payout of \$120,000.00. For that period, employee injury is the greater risk.

Risk Assessment With this background, I will now relate what I learned from the insurance professionals I consulted, and offer some suggestions which could lower your risks, or perhaps even mitigate your insurance premiums. In determining how great a risk is posed by a gunsmithing operation, many of the potential areas of liability are connected to the question of whether or not the gunsmith is working as a one-man shop or has employees.

The presence of employees definitely makes things riskier from an insurer's standpoint because it is assumed that employees will operate motor vehicles in the pursuit of their employer's business interests, and may interact with each other and with customers, in ways that are less than fully responsible.

Overall, the risk from operating motor vehicles was regarded as slight, primarily because underwriters have noted that most gunsmiths receive their materials and parts through delivery services and are less inclined than previously to send employers out to retrieve items necessary to the shop.

However, this analysis can become significantly less favorable to the gunsmith in a particular case where employees are expected to make routine retrievals and deliveries, especially if they are expected to be available by cell phone while driving or if they are required to make trips on behalf of their employer to unfamiliar territory. The assessment also becomes less cheerful when insurers look at the employees' propensity for hurting themselves, fellow employees, and customers.

The term "hurting themselves" obviously includes worker's compensation claims. Self injury caused by laziness and inattention is a risk in any setting where employees are required to engage in lifting, repetitive motion, the handling of noxious materials such as varnishes and solvents, or operating powerful machinery. I have observed these last three areas of activity in the shops of gunsmiths who have performed work for me and I engage in them myself in my own home shop.

The underwriters consulted also pointed out that employees may have the opportunity to negligently wound themselves or others when testing customer firearms and this caused them a very high level of concern, a concern backed up by a documented history of such accidents.

POTENTIAL LIABILITY OF THE PROFESSIONAL GUNSMITH CONTINUED

ORIGINAL PAGE 14

The risk of property loss by fire is also directly related to the above mentioned varnishes and solvents.

I have never handled a claim arising out of fire damage to a gunsmithing operation but I have handled more than ten in my career in which contractors using wood finishing materials have burned down their own premises, one in which a floor refinishing company accidentally set fire to its customer's office building when the fumes from an exotic varnish were sucked into the HVAC system and set off by the sparks from an open fan motor.

I cannot help but notice that fine wood-working is fine woodworking, be it a making a staircase or a gunstock, and many of the gunsmiths I know devote a large percentage of their time to stock finishing. If not judiciously managed, the presence of finishing materials creates a real hazard.

The fact that guns and ammunition are necessarily present at a gunsmithing site is a pervasive unique risk which, in the experience of insurance companies, magnifies the potential losses in the workers compensation and premises liability categories. In an ordinary shop, an employee can injure a fellow employee or a customer by dropping a hammer on his head. In a gunsmithing shop, the heedless employee can shoot another employee or a customer, a possibility which frightens insurance companies very much.

In their estimation, which is based on their claims experience, accidental injuries in gunsmith's shops are more likely to be fatal than those occurring in other places of business, and even when not fatal are likely to be more serious. The possibility of an accidental discharge of firearms is bad enough but it is magnified dramatically when a gunsmithing operation is coupled with a shooting range, an arrangement I am noticing more frequently in recent years.

I believe that this business arrangement is still rare but it is common enough that insurers are identifying it as a risk of the

gunsmithing trade. Be advised that if you enhance your firearms repair business by adding a shooting range, it will probably increase your income but do not expect your insurance premiums to remain reasonable.

Biggest Risk All of the risks identified above are deemed to be serious for underwriting purposes but they are exceeded by the most serious worry of underwriting professionals, which is the risk of criminal activity provoked by the presence of weapons and ammunition at an insured business. Criminals view guns as the tools of their trade and seldom acquire them lawfully. Insurers report that armed robberies and burglaries of insured gunsmiths are increasing in frequency and in the value of the property taken.

The consequences of such crimes are especially unpredictable because they often provoke frantic and ill advised responses from everyone present at the scene. I had direct experience of such a situation many years ago as a junior attorney assisting a senior partner in a claim which arose out of the burglary of a gunsmith's shop. Our insured 'smith was an older gentleman, an FFL holder who combined general machine work with specialized gunsmithing on high end bolt-action rifles.

He was working late one evening when he realized that an intruder had entered his premises through an open door. He quickly ran to the door and locked it with a deadbolt, effectively imprisoning the offender. While not leaving the premises, the gunsmith armed himself and called the local police, who responded quickly. The responding officers told the 'smith to stay put and entered the enclosed area.

Unfortunately, our client couldn't resist the urge to "help" the police and followed the officers into the shop while brandishing his own handgun. The criminal saw the 'smith pointing the pistol in his direction and fired his own weapon, missing him but hitting an officer in the abdomen, inflicting a serious wound that left the po-

liceman unfit for a law enforcement career. The result was along prison sentence for the burglar and a lawsuit by the downed officer against our client.

After several years of litigation, we were able to successfully argue that most of the fault should be attributed to the criminal but the jury still found our client to be responsible for twenty-five percent of the officer's damages. Twenty-five percent of an enormous sum of money is still an awful lot of money. Had the gunsmith lacked insurance coverage, the jury's verdict would have wiped out his life savings. As it was, the officer agreed to a post-trial settlement rather than contend with an appeal.

This cut the loss to the insurance company but the money paid to the policeman was still big by any standard. I describe the facts of this case to illustrate for the reader why many insurance carriers may regard criminal activity to present the greatest risk they assume when they sell coverage to gunsmiths. Criminals themselves can inflict injury on customers, employees, and bystanders, but they sometimes incite the victims themselves to do irrational things which magnify the danger posed by the criminal himself.

If guns are not securely stored, there is the troubling prospect of the additional liability a gunsmith might incur if criminals remove guns from the premises and use them to commit robberies and murders. To summarize what I learned by conferring with my acquaintances in the insurance industry, the danger of crime provoked by the presence of firearms and ammunition will probably be regarded as presenting the greatest risk of loss, followed by the danger of faulty workmanship or bad installation of parts.

General premises liability (such as slip and fall accidents and other injuries to patrons caused by conditions at the work site) will be regarded as nearly equal to the danger presented by gunsmithing er-

POTENTIAL LIABILITY OF THE PROFESSIONAL GUNSMITH CONTINUED

ORIGINAL PAGE 15

rors. The danger of fire damage and consequent property loss will come in a close second to premises liability, followed by “bailment liability” (loss of customer guns through theft or inadvertent damage). Unless the gunsmith and his employees have exceptionally bad driving records, automobile liability will likely be deemed the lowest risk an insurance company faces.

Lowering Costs All of this would be useless knowledge were it not for the fact that you can probably use it to make the equation more favorable to your pocketbook. Most insurance carriers can be persuaded to offer a business proprietor lower premiums if he can demonstrate that he has considered these risks in advance and has taken meaningful steps to reduce them. While I have not undertaken to create a complete checklist, a number of sound practical measures come to mind.

To address the danger of crime, have you placed a serious physical barrier between the area where your customers meet with you and the area where you and your employees store firearms and carry out repairs? Do you and your workers have a plan in place, such that everyone involved in your business will know exactly what to do when confronted with an armed robber?

Do you have a secure way of storing firearms and ammunition when your shop is closed, meaning a storage facility secure enough that thieves will have little motivation to try and breach it? While I am not against burglar alarms and video surveillance, my experience in the area of theft losses leads me to believe that such systems are more likely to inform you that you have been robbed than they are to prevent theft altogether.

They appear to be most effective when combined with physical barriers like steel doors and secure vaults because burglars do not want to be videotaped, with a siren screaming in the background, while they devote hours to beating on an impregnable

gun safe. The safest practice is to discourage criminals from even making an attempt.

To counter the danger of true “gunsmith malpractice”, what sort of ongoing education are you and your employees receiving to guarantee that you’re on top of your game when repairing and modifying guns? Even if you’re certain of your own abilities, have your employees had their knowledge and abilities tested and verified? If you undertake to restore the appearance of a gun which is unsafe to shoot, have you required your customer to sign a statement acknowledging that the weapon should not be fired?

If you have to testify under oath, what measures can you show you have taken to guarantee the safety and thoroughness of the work done in your shop? How safe are your business premises for those heedless customers who never seem to be aware of where they are walking? When they are walking back to their cars with bundles in their arms, unable to see where they are stepping, do you and your employees offer to assist them back to their vehicles? Have the rickety steps leading up to your front door been repaired?

And what about the leak in the roof? Is there a danger that it could let water into your premises during a late night rainstorm, flooding your workspace and damaging your customers guns? To make your thinking on these subjects fruitful, I strongly recommend that you contact your insurance carrier and, if you have not already done so, request a conference with the company’s loss prevention specialist, who may also be identified by the rank of “safety engineer”, “loss control specialist”, or several other titles.

Many of these specialists have completed specific education related to loss control and are certified by insurance and engineering organizations. Reputable insurance companies employ them to improve the safety practices of their insureds. You can make yourself more attractive as an insurance customer by showing a proactive

attitude towards loss prevention, an attitude best demonstrated seeking the advice of your company’s experts.

Let your carrier know that you want to save money on your premiums by improving your operations, and request a walk-through inspection of your business by their safety hounds, something your insurer should be pleased to provide to you. I have had clients who resisted inspections because they feared the insurer would spot things unfavorable to them and use this as a reason to raise their premiums. In my experience, the result has been quite the opposite.

Insurers appreciate it when their customers take the initiative in an honest effort to make their operations safer and they will take this into account when setting premiums. In the final analysis, I believe that you will derive your greatest benefits from the business relationships you cultivate and maintain over the long haul.

Take the time to locate an attorney you can work with, one who is willing to take the time to understand the challenges you face in your business, and make his or her acquaintance before you find yourself in dire need of legal advice. The same considerations apply to the insurance professionals you deal with, who should be people who show a genuine interest in helping you avoid losses by controlling risks before they become accidents.

Last but not least, you would be well served to make friends with the law enforcement officers who work your area and listen carefully to the advice they can give you about securing yourself, your customers, and your employees against the threat of crime. An ounce of prevention is worth a pound of cure. The author gratefully acknowledges the assistance of Mr. John L. Roberts in the preparation of this article. Mr.

Roberts is a member of the underwriting staff at Mountain States Mutual Casualty Company in Albuquerque, New Mexico. AG

PISTOLS

Aftermarket Pistol Barrels

Using and fitting aftermarket barrels for pistol projects.

BY ROBERT K. CAMPBELL NOVEMBER 2017

ORIGINAL PP. 16-19

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I am sometimes surprised by the potential of modern factory handguns. Quality handguns are very accurate, well made of good material, and offer impressive reliability. But there is room for improvement. Among them is fitting a match-grade barrel. Properly fit, a quality aftermarket barrel can considerably improve precision, with less slop and eccentric wear. This allows greater accuracy and longevity over the long run.

With custom fitting by a gunsmith, looser tolerance s needed for reliability for mass production can be reduced, improving accuracy with no loss of reliability and improved wear. Fit is more than filing the barrel until it can slip into the slide. Even if it results in im-

proved accuracy, imperfect fitting won't yield maximum potential. The secret is taking care in fitting, being pains- 38 Super in a .38 AMU barrel.

A Bar-Sto .38 Super barrel, below, solved the problem of putting the pistol back into action. taking, and working slowly to achieve the best results. My aftermarket barrel preference are those from Bar-Sto Precision Machine (Bar- Sto.com, as they area family business producing excellent quality barrels since 1967. The first custom handgun barrel I used was a Bar- Sto. While the gunsmith's part is important, high-grade aftermarket barrels have features making them superior to factory production.

Bar-Sto uses an eleven-degree match crown versus the factory-standard rounded profile along with more precision cut lands and grooves. Not Just 1911s While most of my barrel work revolved around 1911 handguns, this changed with the introduction of the Glock as the factory's polygonal rifling wasn't compatible with lead bullets. Aftermarket barrels were offered that were suitable and these conventionally-rifled barrels offer good accuracy.

While there are several available, if we are going to fit a barrel we might as well go ahead and go with Bar-Sto. Accuracy has been considerably improved in the examples I have fitted and tested.

AFTERMARKET PISTOL BARRELS CONTINUED

ORIGINAL PAGE 17

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Among the first was a Glock 22. When the .357 SIG was introduced I wished to test the cartridge without obtaining another firearm and ordered a Semi Fit Bar-Sto barrel in the chambering. Glock 22s typically held about four-inch groups at 25 yards with select ammunition, with some loads turning in six inches. Adding a set of Novak sights helped practical accuracy but intrinsic accuracy was still poor. After fitting a Bar-Sto barrel, several loads averaged less than three inches.

A drop-in Bar-Sto barrel for a Glock 36 ordered in ported form primarily for economy use with lead bullets seemed to lower recoil and yielded excellent accuracy. When the owner later elected to have the barrel shortened by cutting the ported section, accuracy remained good to excellent. Match Target and Semi Fit are the two general Bar-Sto categories. Critical dimensions are oversize in the Match Targets, while Semi Fit usually drop right in SIGs and Glocks without fitting.

With 1911s, some fitting is needed about half the time. Not too many years ago, I ordered Semi Fits in 9mm and .38 Super for a Colt Government Model and both dropped in. Match Target barrels for the European pistols are deliberately oversized in the barrel hood and lower lugs. The big difference between Bar-Sto and factory barrels is in the precision of machine work. I have seen some pretty ridiculous notions regarding chambers and tighter bores that simply are not true.

The fit of the barrel to the slide and the precision of the rifling is what makes a match-grade barrel. SIG and Glock pistols butt the barrel hood into the ejection port for lock up. The barrel hood of a Match Target barrel is oversized and must be filed to achieve a good fit. The process isn't complicated but you must take your time. Simply removing metal until the barrel fits and the handgun functions may suggest you have fitted the barrel.

However, even if there are accuracy improvements by virtue of the precision of the barrel, a greater edge in accuracy is obtainable. Fitting The barrel hood is marked with red or blue Sharpie for reference prior to beginning work. Comparing a Match Target barrel to the factory barrel shows how much metal will be removed. It isn't much! Drop the barrel into the slide and attempt to lock the barrel to the slide.

When the barrel is removed the marking will be smudged where the oversize barrel hood is preventing the barrel from locking up. The barrel hood is carefully filed and then fitted into the ejection port, a little at a time, until the barrel fits snugly but may be removed with just slight finger pressure. The locking or camming surfaces on the lower barrel are also marked and the barrel fitted into the frame in the same manner. Take your time, a stroke of the file at a time.

This is where some misunderstand barrel fitting and simply remove metal until the barrel

AFTERMARKET PISTOL BARRELS CONTINUED

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locks up, removing too much too soon with too many strokes of the file. Take your time on this project and understand the difference. It is rather easy to file the barrel to fit but more difficult to achieve an optimum gunsmith fit. If the barrel easily drops into a different pistol of the same make, perhaps the fitting wasn't ideal. The fit must be tight to the individual handgun. I fit barrels until the slide has the slightest hesitation in locking.

The final fit is done by heavily lubricating the handgun and firing a magazine to seat everything. It works for me, though some debate 45 caliber handgun. this procedure. It is similar to the break-in period of a tight match-grade handgun. With Semi Fit barrels, the first step is to drop the new barrel into the

slide and examine. SIG and Glocks usually don't require fitting with an improvement in accuracy potential. As for the amount of improvement, it is incremental in some handguns and surprising in others.

Where the first generation Glocks chambered in .40 S&W would see groups cut in half with a Bar-Sto barrel and adding better sights helped more. As one shooter summed it up, this allowed the Glock to become a 50yard gun instead of a 25-yard gun. A good SIG may see improvement from a 2.5" group with quality ammunition down to 1.5-2.0". While I use ordinary ball ammunition for function testing, Federal Match stands alone for testing Bar-Sto barrel accuracy.

A handload with a Magnus 200 grain SWC over enough Tite Group to reach 900 fps gives similar results in the .45 ACP, while Fiocchi 124 grain Extrema works well in the 9mm. There are few truly accurate factory .38 Super loads but the SIG Sauer 125 grain FMJ load gives acceptable results. 1911 dropin barrels often yield improvement of about an inch in group size.

Fitting a Bar-Sto to a Rock Island 1911 is a more profound two inches over the factory barrel. 9mm/.38 Super In factory 1911s, .38 Super has a deserved reputation for inferior accuracy compared to .45 ACP and new 9mm variants. The situation equalizes when a Bar-Sto Match Target barrel is fitted. The Super enjoyed a small but loyal fan base for years

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because of this. Bar-Sto begin chambering the barrel to allow the case to properly headspace on the mouth rather than the Super's case rim, where Colt originally headspaced on the rim, a throwback to the 1900 .38 ACP. This greatly improved accuracy, taking a 4-6" gun at 25 yards to a two inch. Recently, I've had good experience with the new Ruger SR1911 9mm, an accurate pistol with a lightweight, Commander-style frame.

Ruger improved on the 1911 by changing the plunger tube to a permanently affixed rather than staked-on style.

Inspiration came to convert this pistol to .38 Super. Bar-Sto did the work but their procedure is worth discussion. The barrel hood should fit the slot in the breech face but the side should not make contact, just a few thousandths on each side. The width of this slot is 0.442" and Match Target barrel hoods are 0.451" so some fitting is needed. The barrel hood is filed until the fit is tight

and the barrel drops into the slide, contacting the breech face. That is width. Barrel hood length is fitted next.

The barrel will not usually travel far enough to the rear for the locking lugs to lock into the slide. The hood length of the barrel may be 1.33" and the recess in the 1911 slide is around 1.314 inch, making this close work that must be exact. 0.016" of material is the measurement. While specific measurements may differ on different 1911s, this is a good guide. The barrel hood will lock properly and just touch the breech-frame without binding. It must fit evenly.

The final touch involves lapping compound and tapping the barrel in and out of the final fit. Not done yet! The lower locking lugs must also be fitted in the Match Target barrel. When the pistol is in battery the barrel is wedged between the slide stop at the bottom and the locking lugs of the slide with no movement at all. There is a definite stop as the barrel locks. While the

inexpensive 1911s just don't have it, Springfields, Rugers, and Colts do to a certain extent.

A Match Grade barrel feels and performs better. Slide stop pins are available in over-size configuration but the factory slide stop works fine. Both lower lugs must be flitted in order to put pressure on the slide stop evenly as they bear on the slide stop while in battery. Marking the slide stop pin shows how the lower lugs bear on the slide stop as the 1911 goes into battery. One lug will often show more contact than the other. File that lug until both lugs are bearing evenly on the slide stop pin.

Cut the locking lugs until the slide locks up tight. For a super accurate fit the slide will require the slightest nudge to fully close when the slide is eased forward. I like this type of fit for superb accuracy, but unless you are very familiar with the process you may not achieve both good accuracy and excellent reliability. AG

RIFLES

New AR-15 Triggers

An overview of good trigger action, how the AR-15 does it, and how it can be improved.

BY ROBERT K. CAMPBELL NOVEMBER 2017

ORIGINAL PP. 20-23

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I am presently working on anew book project. It is quite challenging but very rewarding at the same time. This new book on rifles, marksmanship, and personal defense is years in the making. I have had the opportunity to test and evaluate quite a few AR-15 rifles. Inevitably, the rifles come up short, to my standard, in one way or the other as they are pushed to the highest degree. The rifles are reliable, in the best versions, and the Colt, Ruger, CORE, and Smith and Wesson rifles have given good results overall.

One area that has been less than ideal for accuracy work is the trigger. Of those tested, the average was around six pounds. I was not surprised. I recently tested HK-type .308 rifles with triggers as much as nine pounds! This isn't ideal for good accuracy. The AR-15 rifle's trigger action was

designed for durability and ruggedness, not precision. The rifle may be hot or dirty but the trigger will reset.

The action is suited to a military rifle with full auto capability but accuracy potential cannot be fully realized with the standard unit. While some triggers may be managed well enough from a solid benchrest, from position (especially offhand) hits are more difficult. For this reason, I have replaced many triggers over the years. How AR-15 Triggers Work Standard AR-15 triggers have a front that lies in a notch in the hammer to remain a full cock. There is no intermediate sear.

The disconnect and spring ride inside of the trigger, and the disconnect hook is located at the rear of the hammer. With the safety applied, the rear of the trigger cannot rise. When moved to "fire", the safety clears the trigger. When the trigger is pressed, the trigger moves from its slot in the hammer

and the hammer falls. After the rifle fires the bolt carrier recoils and cocks the hammer. With the trigger still depressed, the disconnect hook grasps the disconnect.

Releasing the trigger releases the hammer from that hook, giving a characteristic click as the trigger resets. If modified or worn, the disconnect tips too much to the rear and the rifle may fire when the trigger is pressed and again when the trigger is released for reset. If the disconnect fails the rifle may not fire at all as the hammer will ride down with the bolt without firing the rifle. AR-15s for civilians are more akin to a Designated Marksman Rifle than the short barrel full-auto used by the military.

Repeatability and reliability is paramount, with a smooth trigger action and rapid reset. Most of us prefer a smooth trigger to a light trigger but both lighter than standard and smooth is good to have. For a service rifle the action must be reliable with all

NEW AR-15 TRIGGERS CONTINUED

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They are well made of good material. types of ammunition. This means a standard hammer fall. A trigger action with low forces at the trigger may not always equal a heavy hammer fall, so a balance is needed. Hiper Fire Hiper Touch While factory AR-15 triggers are heavier than we like for precision use, they do have a fast reset. After some study I chose the Hiper Touch EDT 3 duty trigger (HiperFire.com, for use in one of my AR-15 rifles.

This rifle was a reliable performer but had left the factory with a nine-pound trigger. I wouldn't lighten a factory action by polishing and removing metal in such triggers because exposing the softer material of the hammer

and trigger could lead to big trouble. A quality The Hiper Fire trigger was delivered with two spring sets. One is for a trigger pull weight of four pounds plus and the other six pounds plus.

What drew me to the design is the geometry of the trigger and hammer allow a light let off while the hammer fall is as heavy as mil spec despite the lighter pull. Other advantages of the trigger are discernible under magnification. The Hiper Fire trigger has slots running the length of its bottom so the disconnect will move debris (unburned powder and other particles) from the trigger to prevent jamming.

The underside of the trigger has been raised and the end ramped up to increase the clearance between the trigger and the lower replacement is demanded. Initial examination of the Hiper Fire trigger showed a good design with excellent fit and finish. The surface was well finished and the parts seem well fitted. fire control cavity. According to Hiper Fire, this will help prevent a blown primer cup or other debris from jamming the trigger. The trigger installed with a minimum of work.

Hiper Fire recommends a 200-cycle dry fire break in. The trigger was delivered lubricated and I performed this

NEW AR-15 TRIGGERS CONTINUED

ORIGINAL PAGE 22

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This is a good fit and trigger action. break-in without problem. To install, clear the rifle, then break the action open and remove the upper assembly. Never allow the hammer to fall on the bolt catch as you can crack the lower receiver. The lower receiver should be stabilized in a vise or block. Drive out the pins holding the trigger and hammer. Remove the trigger action. Assemble the Hiper Fire trigger assembly. Place each side of the spring on the shoulder of the trigger.

When the trigger goes into the receiver, the legs of the spring must be curved under the trigger and facing toward the front of the lower receiver. The disconnect spring will ride in the trigger in the circular cutout. The larger end of the disconnect spring is down in This is a big plus. the trigger and the smaller tip is facing upward. A punch may be used to push this down properly. The disconnect

rides the top of the disconnect spring so that the holes in the side line up with holes in the trigger.

When pressing the trigger pin in to secure the trigger action, be certain it is flush with each side of the receiver. Also, when ordering, be certain to order the correct parts. The Colt AR-15 takes a different trigger pin. I tested a Smith & Wesson M&P 15 fitted with a Hiper Fire trigger extensively with good results. The intrinsic accuracy of the rifle isn't affected but the practical accuracy is.

Using a Burris AR-F3 red dot optic and new trigger, I was able to better my groups by a quarter inch at 50 yards using Creedmoor 75 grain HPBT ammunition. The primary improvement was in rapid offhand fire. A magazine full of a steel cased load was dirtier and much less accurate than the match grade load, but the hammer cracked the primers,

which is all we may ask. Ruger Trigger Ruger surprised me by offering a high quality drop-in trigger for their AR 556 series.

While well suited to any AR-15 rifle, the Ruger uses small pins (0.154 inch) so this won't fit the Colt. The Ruger Elite 452 MSR is a twostage trigger designed for all Modern Sporting Rifles with 0.154" pins, this unit is delivered with a press weight of 4.5 pounds according to Ruger. My example breaks 4.6 pounds so we are on the money, and it should smooth in with use. I have used the Ruger extensively in testing and in the world of seven hundred dollar AR-15 rifles, the Ruger is the one to beat.

The rifle is delivered with sights, and the forward assist and dust cover are intact. The easily removable handguard and serrated front sight ramp are other advantages.

NEW AR-15 TRIGGERS CONTINUED

ORIGINAL PAGE 23

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I carefully examined the Ruger trigger to verify that the hammer is full strength and acceptable for critical use. The 452 MSR uses a lightweight hammer to retain a full hammer strike. To verify reliability, I use handloads with CCI Rifle Primers as they're traditionally hard. When using a rifle with a floating firing pin, a hard primer is a good thing. Resistance to high pressure is also good. I also added a number of steel cased loads in order to quality reliability.

The Ruger 452 MSR is supplied with a safety selector and the springs and pins for installation. I was impressed that the trigger is delivered in a polymer approximation of the AR-15 firing handle. This makes for easy acclimation and dry fire before installation. I am certain this assembly will be found in well-stocked shops and allow shooters to decide if they wish to install the lighter trigger in their personal rifle. Ruger's trigger was easily installed—no surprises there.

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While it would be suitable for any AR-15 with small pins, the Ruger AR 556 was the subject of this test. The trigger settled into 4.5 pounds after a bit of dry fire. The rifle was test fired with a variety of handloads using the CCI rifle primer and also some steel-cased loads that I have not enjoyed the best service with. However, it was all bang-bang with good reliability. Firing at 50 yards for accuracy with the accurate Creedmoor load produced good results.

Both of these trigger actions are relatively new and have passed the road test. They are good kit, well worth their price. When installing, place the lower receiver in a fixture and insert the disconnect spring with the flared side down. Be certain the spring legs of the new trigger rest on top of the receiver's lower interior, not the cut out for the trigger. Be certain of disconnect orientation.

With the trigger in place install the hammer spring legs across the top of the trigger pin and cock the hammer into place. AG

MAINTENANCE & REPAIR

Reader Forum

BY AMERICAN GUNSMITH EDITORS NOVEMBER 2017

ORIGINAL PP. 24

Remington Bolt Mating Surfaces I have a Remington Model 700 chambered in .300 Winchester Magnum in my shop and have a question about bolt mating surfaces. My customer brought it in without a bolt and this is the first rifle I've had to replace the bolt on in all my years working.

My assumption is that factories doing this apply Dykem or similar marking fluid and proceed to close a bolt with a spring-loaded affair that puts some pressure to the flats on the front of the receiver and the back of the bolt to ensure contact on both lock lugs. With this in place it keeps the pair together for attaching a barrel to the receiver.

To accomplish this I thought of using a brass rod that slides in the barrel and apply some spring pressure, perhaps 10-20 pounds of resistance, to swipe Dykem when closing the bolt to mark if there is contact on the back of the bolt lock lugs and their mating surfaces on the receiver. If there is good contact I would check headspace. If good, I'd tell my customer he is good to go. However, no contact on one side or other insufficient contact when comparing lugs is unsatisfactory.

Same thing if the headspace is too large. My advice then would be to take the rifle to a gunsmith with a machine shop to perform the fix. If it's just a headspace condition, I can manage that in my shop. And to think my customer bought this rifle without a bolt in it thinking it was a good deal. Some people's kids, huh?

Robert Koweluk Dillingham, Alaska Since firearm manufacturers do not provide blueprints to anyone outside their production facility, there is no practical way we can determine receiver suitability regarding bolt interchangeability. "Some contact" in referring to the bolt lugs? No way. You need equal contact on all surfaces when the bolt is locked. Proper headspace is to be checked out with cartridge-specific Go, No Go, and possibly Field gauges.

That's if the Browning/Winchester entity will even provide a bolt to you for the project, something which we seriously doubt. We're pretty certain this "deal too good to pass up" will have to be returned to Browning/Winchester to be completed and deemed safe. Such deals frequently lose their dazzle whilst frazzling the nerves, good natures, and budgets of all unfortunates involved. A Follow Up Thank you for the advice!

This has moved my thinking from doing it myself and jury rigging something up to having a gunsmith with a machine shop do the work for me. I will email Remington and perhaps they will recommend a shop that can do a proper job. Money spent having someone with more experience do this job will make me feel much more safe and secure.

While I've successfully managed to always return firearms I've worked on in proper and safe working order and I take pride in that, my pride is nothing compared to my concern for the safety of the gun owners in owning and using their firearms. I have been trying to balance out the economics of a "good deal" of which we know there is generally not any and they often turn out more expensive in having to do work by ourselves to bring the firearm up.

This rifle was such a case and I followed proper work procedures to determine if it was structurally sound to even get it functional. Sadly, this will end up as one of the very few jobs where I do not make a profit. But I am stubborn sometimes and I want to bring it back to service after having been rescued after 15 years from the rubble heap of a house fire. If it turns out the receiver bolt lock mating surfaces are structurally unsound I will have the shop cut the receiver to scrap metal.

Then I will fit/bed the stock for use on my father's Remington Model 700 ADL in 7mm Remington Magnum as Dad always wanted a BDL stock for it. Beautiful piece of wood, that stock. Robert Koweluk AG

SEARCHABLE ISSUE RECORD

Archive index

Clean Shot American Gunsmith Editors	2	Aftermarket Pistol Barrels Robert K. Campbell	16-19
Ruger Ultimate Bullseye Upgrade, Part One David Allen Dumeah	3-8	New AR-15 Triggers Robert K. Campbell	20-23
9mm Flobert Shotgun Sergey Lyalko	9-11	Reader Forum American Gunsmith Editors	24
Potential Liability Of The Professional Gunsmith Joseph Reichert	12-15		

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