AUG 2020

DIGITAL ARCHIVE EDITION

PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

A TECHNICAL JOURNAL OF CRAFT, REPAIR & RESTORATION

08

ARCHIVE ISSUE NUMBER

INSIDE THE ARCHIVE

GETTING IT BACK

COZAD MANUFACTURING · COLT PYTHON · WORKING HOPKINS & ALLEN REVOLVERS, PART 2 · CHAMFERED PRIMER FL...

DIGITAL ARCHIVE EDITION

Preserved for the bench.

This edition presents the original American Gunsmith editorial work in a modern, searchable layout while preserving its issue, author, and source-page history.

ABOUT THIS EDITION

The article text comes from the original issue and has been reflowed for legibility. Obsolete subscription, ordering, association-service, and house-advertising pages are not reproduced.

Original article images appear only where permission has been confirmed. All other image positions remain visibly reserved so approved art can be restored without rebuilding the issue.

Report corrections or rights information to **editor@gunsmithmag.com**.

AMERICAN GUNSMITH

DIGITAL ARCHIVE EDITION · AUGUST 2020

ISSUE RECORD

ORIGINAL DATE	August 2020
VOLUME	Archive volume not stated
ISSUE NUMBER	08
SOURCE ID	ag-d48738adb21cb61ef8137077

DIGITAL EDITION

PUBLICATION	American Gunsmith
EDITION	Digital Archive Edition
ARCHIVE STEWARD	Innovation Network LLC
CONTACT	editor@gunsmithmag.com

Editorial fidelity. Article titles, author attribution, issue relationships, source-page references, and article text remain bound to the archive corpus. Layout, covers, navigation, and conversion notes are newly produced for this edition. Historical statements remain part of the original editorial record.

IN THIS ISSUE

Contents

A complete guide to the searchable editorial work preserved from August 2020.

RIFLES

Cozad Manufacturing

BY AMERICAN GUNSMITH EDITORS AUGUST 2020 ORIGINAL PP. 2

Cozad Manufacturing was founded by Andy Cozad, a Soldier in the Army Reserve and an avid shooter. In addition to his Army Reserve career, Andy worked as a deputy sheriff for 13 years and spent 6 years as a firearms instructor, holding certifications through the Pennsylvania State Police, Commission on Crime and Delinquency, and the National Rifle Association.

During his 2014-2015 Afghanistan deployment, Andy was lodged next to several members of the Australian Defence Force Special Operations Command that were using HK416 and Colt 10.5" guns with Knight's Armament suppressors and were finding a number of weapon failures due to snapped hammer springs and other faulty parts. Their hydraulic buffer was not adequate and had failed to work properly. This was the first piece of the puzzle.

The next piece was when a friend asked Andy to make an AR-10 barrel chambered in 45-70 Government. The recoil of this setup led him to commit to making an improved AR buffer. Having along-standing interest in Eugene Stoner's rifle design, Andy found an improved buffer design to be an opportunity. The goal was to make an effective mechanical buffer that out performed the hydraulic models currently available.

Working through a series of prototypes he identified problems, with redesigns going through several transformations before arriving at the Cozad M-18k. This proved to out-perform hydraulic models while remaining an effective mechanical buffer. The M-18k is a patented design that better absorbs recoil, better controls cyclic rate, and helps improve shooter accuracy, especially in rapid fire. Made from aircraft-grade material and stainless steel, the unit measures 3.25" when compressed and weighs 3 ounces.

Cozad buffers are multi-caliber capable, as the initial 45-70 experiment demonstrates. The company has had good results with their A2 buffer with 458 SOCOM. As one Cozad customer reports, "The buffer cuts felt recoil of 458 SOCOM in half. It actually made my BCA upper run better and will now cycle all bullet weights now from 300 grains up to 576." Cozad also has a pistol caliber carbine model and another for the Barrett M82. New to the line is a buffer for the a Rock Island VR80 shotgun.

Made from 17-4 stainless steel and weighing 2.5 ounces more than the factory aluminum buffer, it was designed to improve function with heavy field, buckshot, and slugs. Contact Cozad at CozadManufacturingLLC.com or call

PEOPLE & COMPANIES

Colt Python

The new Colt Python is a gun alone.

BY ROBERT K. CAMPBELL AUGUST 2020

ORIGINAL PP. 3-6

The new Colt Python was met with much anticipation. Interestingly enough, there are many conflicting opinions and feelings concerning the new revolver. After all, the original Python is revered as Colt's finest revolver of all time, perhaps the finest revolver in the world. I have no argument with that opinion. Colt whetted our interest by introducing anew Cobra a few years ago. By any standard, the new Cobra is a stronger handgun than the original Police Positive Special-size Cobra revolver.

So Colt proved they can produce a superior revolver. In a similar vein the modern Single Action Army and Colt Series 70 handguns are superior to the original as shooters in my opinion. The metallurgy is leagues ahead of the older revolvers. I like the idea that shooters are able to obtain and use a Colt like this for the purpose it was designed for. That is, personal defense, trail use, home defense, and hunting.

By the same token, I have the greatest respect for those that collect and These are improvements with the new Colt Python. Far preserve historical pieces. I march to a different drummer and like to own historical pieces in order to learn how accurate and reliable they are. While the implement is important, the men who used the firearm are more important, and the men who built the firearm also very interesting. There isn't as large a gap in time and technology between the older Python and the new revolver.

I think a great deal of concern is because the pistol is an icon and some were worried that Colt would cheapen the new model. They have not. With several months of evaluation in, I can state the new Python is a better gun than ever. Those concerned with the loss of value

They are very secure! in their original Pythons may have some basis for that. I don't think anyone will be purchasing an original as a shooter when a better shooter is available at $1,500 MSRP. There is also some confusion on pricing. A friend asked how they could sell the new gun for less than what used ones bring. That is simple. The MSRP of the last Python from Colt was about $1200, with production ceasing in 2004.

The present MSRP—and the pistol is built on modern CNC machinery with less hand-fitting—is reasonable. Used Pythons skyrocketed in price because they were out of production, so this is understandable. Funny side note: Colt stopped offering the Python because it wasn't a profitable seller when previously available—I suspect there's something in there to be said about human psychology. I see shooter grade Pythons from the 1970s for about $2,000 (which is a fair price) before the Python came back.

In-the-box unfired guns—the only ones I feel are collectible—bring $2,500 to $3,000 in my area, with a stainless Python commanding a bit more. That's a lot of money for a shooter. Some folks seem to think much inferior guns are worth far more than I would appraise. On the other hand, you see plenty of well-worn Pythons with a ridiculous asking price. A $1,500 dollar shooter is a bit rare as Lock time seems faster and the ejector star is different. people over-value their guns.

I recently saw a Python at a show that someone—Lord knows why—had polished the cylinder to in the white. The gun was originally blue and it looked good otherwise, the grips were nice, and so was the action. The asking price was $2,000. A regular customer flagged me down at the show to take a look at the "affordable" Python he had been searching for. Well, this wasn't the one. I wondered what may have been wrong internally if someone had so little respect for the Python to polish a blued cylinder bare.

Perhaps it had rusted? Who knows? If—and this is a big if—Colt could still do the original Royal Blue it would cost at least $700. The base price for Royal Blue is $495 at the custom shop with $75 dollars per hour for pit and rust polishing. This is a lot of money for what I estimated to be an $800 shooter. If restored—well it depends on the job. So folks with nice collector-grade Pythons need not worry while folks with shooter-grade Pythons they have been representing as collectibles may take a loss.

They have rode the wrong snake/pony. The modern Python isn't the first Colt revolver upgrade. While Smith & Wesson went to anew short ac-

tion after World War Two, Colt went in another direction. The Python was introduced in 1955. Incidentally, Colt reintroduced the Single Action Army the same year. The SAA was built on old machinery and, to an extent, the Python was based on existing revolvers. The Army Special was the primogenitor of the Python. Next came the Official Police. The frame of these revolvers is often referred to as a .41 frame. While they were sometimes chambered for the .41 Colt these revolvers are usually .38 Special.

The .41 frame soaks up recoil more so than the lighter Smith & Wesson K-Frame revolver. Colt intended to chamber this revolver for the .357 Magnum cartridge. When Smith & Wesson introduced the Magnum in 1935, Colt scrambled to offer a .357 Magnum. I am not certain if the Colt Single Action Army or the Colt New Service was the first Colt Magnum. The New Service is a large, brawny revolver that was too large for constant carry by 1950s standards.

In any case, Colt chose to discontinue the New Service after World War Two. Colt offered their Three-Fifty- Seven model on this frame as an affordable Magnum but that is another story. Colt decided to take the Officer's Match, basically a target grade Official Police, and strengthen the revolver. The cylinder frame and top strap were strengthened and liberally beefed up. The recoil plate of the older design was eliminated, making for a sturdier frame. The top strap was widened and the crane made stronger.

A bull barrel with ventilated rib and a full underlug shroud to protect the ejector was added. Colt no longer radiused the muzzle of their revolver barrels with the Python but instead used a flat muzzle with a countersink. The rear sight features a full range of adjustment. A 1/8 inch side blade is pinned to the barrel. The target trigger and hammer are unique to the Python. Examining a vintage Python is extremely interesting. Even the inside of the side plate is flawlessly polished.

The hammer strut is beautiful, being superbly finished and polished. When the trigger pull is evaluated the single action press should register on a narrow band of 2.75 to 3.25 pounds. It isn't well known but the bore diameter of the Python was a bit tighter than others and Colt recommended only jacketed bullets. Hard-used Pythons fired with lead bullet handloads demanded their owners became acquainted with the Lewis Lead Remover.

Colt changed the grips to better accommodate spent case ejection and speedloader use later in production. The New Python Some of the changes to the new Python are obvious, others not as much. The measurement of the top strap is a bit difficult as the design differs from the original. The strap toward the barrel is at 0.46 and widens to 0.68 inch in the old gun while it is 0.40 to 0.65 with the new gun. The cylinder measures 1.55 in each and the crane is the same.

The cylinder differs on the ejector star and in the rear face, so it would not fit the older Python. The new sight is more rugged in appearance and more positive in function than the original. The new front sight is removable. Quite frankly, it looks like Colt took a look at the Ruger GP 100. That isn't a bad place to be. The grip angle is subtly different. It feels better and when firing the piece rapid fire with Magnum loads the grip doesn't climb up the hand as the older guns may.

The subtle change in geometry is a good one. The action is very smooth. The double action trigger breaks at nine pounds, one ounce according to my Lyman trigger registering gauge. The single action trigger is two and one quarter pounds and very clean. The break could not be cleaner. Frankly, if I felt this double action press on an earlier Colt I would fear the revolver would not fire reliably as it is too light.

However, I found the new Colt to be reliable with everything I fed it, including handloads with CCI Magnum primers, which are hard primers that withstand heavy pressure. The action is a transfer bar type in the modern sense. This type of action handles Magnum pressure well. The Python and the Colt Three-Fifty-Seven will break firing pins if dry fired extensively. I have repaired several. I believe the new Python will not suffer this problem. Not that the Python is fragile

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact **editor@gunsmithmag.com** and reference AG-1EF8137077-A2352-P06-F01. Know the rights holder? Please ask them to contact us.

AG-1EF8137077-A2352-P06-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact **editor@gunsmithmag.com** and reference AG-1EF8137077-A2352-P06-F02. Know the rights holder? Please ask them to contact us.

AG-1EF8137077-A2352-P06-F02

It is a great shooter. These are the guns that will see resale value hard hit by the introduction of the new Python. in the original version, this is simply a consideration. Next, the barrel crown. The new Python features a nicely-done, recessed muzzle. It is well finished. The front sight is removable by use of an Allen wrench. The old sight is pinned in and may be changed but it is much more difficult. The action differs considerably from the original.

The V-spring is much the same but the hammer strut is now anchored in the grip frame. The action is both smooth and strong, no worries there. The new grips do not fit the old frame or vice versa. That is understandable. When you remove the grips from the new Python revolver you have an experience very much unlike any with the original. I have handled new in-the-box Pythons for years and have never handled a set of grips so tightly affixed to the handgun, save perhaps Nill-Griffe grips on the P7M8 Heckler and Koch.

I removed the grip screw and then shook it loose. The grips did not budge. A rubber hammer against the frame did little. There is a small opening near the top of the front strap and I carefully used a small flat tool to budge the grips apart—it took time. There is a small pin that holds the front strap of the grips in place and together and does not allow movement. A total of four parts stabilize the grips.

There are individual pins in the front and back strap of the grips, a positioning in the frame, and the grip screw. This is a nice touch that impresses with the thoroughness of the design. The revolver proved reliable with all .38 Special and .357 Magnum ammunition. It is difficult, even tiring, to get the most accuracy of a handgun like this, as opposed to fun shooting. Very good groups are easy. Achieving the excellent groups the gun is capable is more difficult.

At this point the best results have been with the Black Hills Ammunition .38 Special 148 grain wadcutter at just less than one inch for a five-shot group at 25 yards. The new design should be more robust in dry fire. Just the same, use snap caps. Most .357 Magnum loads are good for 1.25 inches. A word on firing the Python. Smith & Wesson revolvers are powered by a leaf-type mainspring. The trigger is returned by a trigger return spring.

Firing the Smith & Wesson differs from the Colt, although J-Frame S&W revolvers use a different spring. Colts uses a V-spring to power both the hammer falling and the trigger return. The trigger must be allowed to reset. It you attempt to press the trigger before the trigger has reset, the cylinder may skip. This has led to criticism of the new Colt by the same shooters that complained about the original. Different systems demand different techniques.

This is something to be aware of if the Python comes into the shop with a complaint. It may be shooter error. The new Colt Python has endured some controversy and I am certain it will be the subject of derision by some. The Python will be much appreciated by shooters. It is a viable replacement, even an improvement, over earlier Pythons. I own both. While I enjoy the original very much the new 2020 Python will be going to the range much more often.

As for pertinent questions— there is no part of the old Python that will fit the new or vice versa. The grips differ as they must. The frame geometry is changed for better control. The cylinder is a different design despite the dimensions and it would be pointless to attempt to fit the new model cylinder to an older handgun. The grips, sights, trigger, hammer, and internals, even the firing pin, differ. So old parts will not fit the new gun and vice versa.

The barrel profile is different so the new gun barrels cannot be interchanged with the older gun. Unlike the modern 1911, there is no interchanging the new Python for the old gun parts wise. This shows a tremendous amount of re-design and a commitment from Colt to produce a superior handgun. AG

PISTOLS

Working Hopkins & Allen Revolvers, Part 2

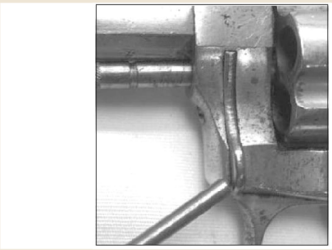
BY BRIAN R. SMITH AUGUST 2020 ORIGINAL PP. 7-10

Right: XL is one of the names H&A applied to its solid frame revolvers which featured double action and single action. This five-shot example is chambered in .32 S&W and features a loading gate.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

Below left: Loading gate on the .32 XL. Some had the little thumb button as shown, others employed a fingernail groove instead. Not all XL and solid frame H&A models were so equipped; many featured a simple cartridge groove on the right side of the recoil shield. Below right: Punch tip points to the cylinder axis pin retaining lever. The XL featured this improvement which facilitated removal of the cylinder so that cartridges or cases could be readily extracted by fingernail or tool.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED



Below left: Loading gate on the .32 XL. Some had the little thumb button as shown, others employed a fingernail groove instead. Not all XL and solid frame H&A models were so equipped; many featured a simple cartridge groove on the right side of the recoil shield. Below right: Punch tip points to the cylinder axis pin retaining lever. The XL featured this improvement which facilitated removal of the cylinder so that cartridges or cases could be readily extracted by fingernail or tool.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

This second part will examine H&A XL solid frame revolvers. by Brian R Smith In the last issue, the single action, spur trigger Hopkins & Allen revolvers were examined and disassembly procedures outlined. The second Hopkins & Allen revolver type under consideration is the XL solid frame, double action, extractor-less model and its similar H&A siblings. These were predominantly sold in .22, .32 and .38 caliber, and some were fitted with loading gates.

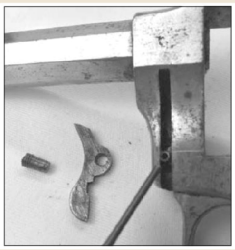
Less expensive models had only rounded loading grooves in the right side of the recoil shield, allowing clearance for cartridges to be inserted in and removed from the cylinder. On the larger-framed examples, H&A offered an optional extractor assembly mounted on the cylinder axis pin, making the revolver on 32 XL. Some had the little thumb button as shown, others employed a fingernail groove instead.

Not all XL and solid frame H&A models were so equipped; many featured a simple cartridge groove on the right side of the recoil shield. The XL featured this improvement which facilitated removal of the cylinder so that cartridges or cases could be readily extracted by fingernail or tool. This five-shot example is chambered in .32 S&Wand features a loading gate. which such an assembly was mounted appear not unlike a Colt Single Action Army.

The specific XL model described here is the solid frame H&A XL in .32 Short Colt featuring a hinged loading gate. It's a small nickel-plated handgun featuring a hexagonal barrel and hard rubber grips. The other XL models are chambered in .38 S&Was well as .32 Short Colt with the .38s being proportionally larger. They resemble the smaller Harrington & Richardson New American and Victor revolvers. Take down of the solid-frame XL begins with removal of the cylinder from the frame.

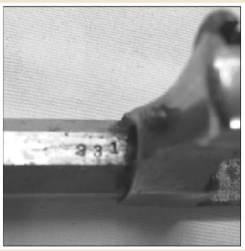
This is performed by pressing the cylinder axis pin retaining lever inward while simultaneously withdrawing the cylinder axis pin. The retaining lever is found vertically on the forward end of the left side of the frame, in front of the cylinder window. The cylinder can then be removed from the right side of the frame. The cylinder axis pin retaining lever and its spring are removed by unscrewing the pivot screw from the front of the frame under the barrel. This screw is standard right-hand threaded.

Once the screw is loose, control the axis pin retaining lever with a thumb to prevent it and its spring from being launched across your shop. Next, the grips are removed by loosening the grip screw until it clicks. Pushing on the screw with the screwdriver still engaged, pop off the right side grip panel. The left grip panel can be removed by pushing from behind with a fingertip, punch, or screwdriver. Always



Above left: Removal of the cylinder latch pivot screw from the front of the frame unfastens the latch lever. Be aware of the coil spring in its circular recess in the latch lever mortise, indicated by the punch tip. Above right: Serial numbers on H&A XL solid frame revolvers were located on the underside of the barrel as well as the rear face of the cylinder and the frame underneath the left grip panel.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED



Above left: Removal of the cylinder latch pivot screw from the front of the frame unfastens the latch lever. Be aware of the coil spring in its circular recess in the latch lever mortise, indicated by the punch tip. Above right: Serial numbers on H&A XL solid frame revolvers were located on the underside of the barrel as well as the rear face of the cylinder and the frame underneath the left grip panel.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

Below left: Remove the fragile, hard, rubber grips by first loosening the grip screw, then pushing on the screw with the screwdriver to dislodge the right side grip panel. Then use finger pressure on the inside center of the left grip panel to pop it loose. NEVER pry with a screwdriver or knife blade. Below right: Use pliers to move the bottom end of the mainspring forward and out of its seat in the frame, then pull or push sideways and withdraw.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

Below left: Remove the fragile, hard, rubber grips by first loosening the grip screw, then pushing on the screw with the screwdriver to dislodge the right side grip panel. Then use finger pressure on the inside center of the left grip panel to pop it loose. NEVER pry with a screwdriver or knife blade. Below right: Use pliers to move the bottom end of the mainspring forward and out of its seat in the frame, then pull or push sideways and withdraw.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

Be aware of the coil spring in its circular recess in the latch lever mortise, indicated by the punch tip. refrain from prying grip panels off with a screwdriver as they can be dented or cracked and the frame scratched in the process.

With the grips removed from the frame and the hammer uncocked and forward against the frame, grasp the lower end of the S-shaped mainspring with needlenose pliers and pull it forward and then to either side to unseat it from Then use finger pressure on the inside center of the left grip panel to pop it loose. NEVER pry with a screwdriver or knife blade. the frame. Note that the seat for the upper end of the mainspring in the underside of the hammer will be marked by a slightly shiny notch or groove of sorts.

Also note that when working on a hammerless XL example, the mainspring is Vshaped with a heavier-sectioned length welded on and engaging the hammer. The other end is bent into a curve and engages the backstrap. Pay attention to its orientation as you grasp the curved end of the mainspring to remove it. Next, use a pin punch and bench block to remove the trigger guard by drifting out the forwardmost pin in the frame beneath the midpoint of the cylinder window from right to left.

Whenever possible I leave pins partially engaged in the frame so that I know which pin belongs in which hole and also so that I don't lose them. With the front pin out, the trigger guard will pivot down at the front, assisted by the trigger reset V-spring. The rear of the trigger guard of this example has a projecting lip or tab that seats in a recess in the frame at the rear of the trigger guard slot. The trigger guard lifts down, forward, and out of the frame.

Note that earlier examples of H&A solid frame revolvers had a second pin retaining the rear of the trigger guard; on those models, drive it out as well. Back to this example, the rearmost pin is drifted out next and it secures the hammer rebound lever. Once freed, the rebound lever can be set aside. Remove the hammer by unscrewing its pivot screw. The hammer will need to be manipulated up and forward so that its "tail" will clear the frame at the rear of the hammer slot.

Once the tail clears, withdraw the hammer up and out of the frame. The trigger itself is next to be removed. Drift out the middle pin in the frame beneath the cylinder window. Once the pin clears the trigger, withdraw the trigger assembly down and out of the frame. This XL .32 is equipped with a loading gate that resides in a slot in the right side behind what would be the right recoil shield. The gate itself forms much of the right recoil shield and it is held in place by a screw at the bottom.

This loading gate pivot screw is tiny, flush fitting with the frame, and features a very narrow slot. The loading gate closure force is

Above: With the cylinder and mainspring removed, this view shows the proper positioning of the hand and cylinder stop with the hammer cocked and the trigger in the single action position. Above right: Remove the trigger guard by driving out the front crosspin. The trigger guard is retained on this particular model by the crosspin at the front and a hook at the rear which engages a recess in the frame. Removal of the middle crosspin allows for withdrawal of the trigger assembly, which includes the cylinder stop and hand.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

Above: With the cylinder and mainspring removed, this view shows the proper positioning of the hand and cylinder stop with the hammer cocked and the trigger in the single action position. Above right: Remove the trigger guard by driving out the front crosspin. The trigger guard is retained on this particular model by the crosspin at the front and a hook at the rear which engages a recess in the frame. Removal of the middle crosspin allows for withdrawal of the trigger assembly, which includes the cylinder stop and hand.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

Below: Exploded view of XL top break components. Clockwise from 12 o'clock, cylinder, hammer/pawl assembly, hammer axis screw, mainspring, grips, grip screw, grip area of frame, rear crosspin, hammer rebound lever, trigger assembly with hand and cylinder stop, trigger axis crosspin, trigger reset V-spring, front crosspin, trigger guard (at bottom), cylinder axis pin latch lever (latch lever coil spring is in recess in frame), cylinder latch lever pivot screw, and cylinder axis pin.

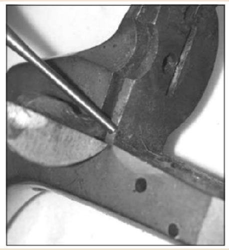
ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

The trigger guard is retained on this particular model by the crosspin at the front and a hook at the rear which engages a recess in the frame. Removal of the middle crosspin allows for withdrawal of the trigger assembly, which includes the cylinder stop and hand. applied by a leaf spring that is in the loading gate's slot. That leaf spring is in turn captured by a chrome-plated, flush-fitting, slotted screw at the top of the loading gate slot. This screw also has a tiny hole drilled in the head on this example.

It is not recommended to remove either the loading gate pivot screw or the loading gate spring retaining screw unless the Clockwise from 12 o'clock, cylinder, hammer/pawl assembly, hammer axis screw, mainspring, grips, grip screw, grip area of frame, rear crosspin, hammer rebound lever, trigger assembly with hand and cylinder stop, trigger axis crosspin, trigger reset V-spring, front crosspin, trigger guard (at bottom), cylinder axis pin latch lever (latch lever coil spring is in recess in frame), cylinder latch lever pivot screw, and cylinder axis pin.

Above left: With the trigger guard removed, driving out the rear crosspin allows the hammer rebound lever to be withdrawn (bottom center). Also shown is a screwdriver removing the hammer axis screw. Above center: Closeup of trigger assembly showing the hand and the coil spring-loaded plunger that applies force to the lower end of the hand when assembled. Out of sight on top of the trigger assembly is the cylinder stop. Above right: Tip of punch points to the area of the loading gate pivot screw head. This screw is tiny and is best left unmolested unless it is absolutely necessary to remove it.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

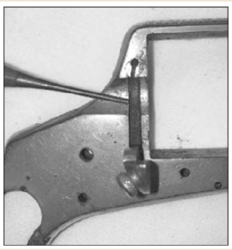


Above left: With the trigger guard removed, driving out the rear crosspin allows the hammer rebound lever to be withdrawn (bottom center). Also shown is a screwdriver removing the hammer axis screw. Above center: Closeup of trigger assembly showing the hand and the coil spring-loaded plunger that applies force to the lower end of the hand when assembled. Out of sight on top of the trigger assembly is the cylinder stop. Above right: Tip of punch points to the area of the loading gate pivot screw head. This screw is tiny and is best left unmolested unless it is absolutely necessary to remove it.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

Above left: With the trigger guard removed, driving out the rear crosspin allows the hammer rebound lever to be withdrawn (bottom center). Also shown is a screwdriver removing the hammer axis screw. Above center: Closeup of trigger assembly showing the hand and the coil spring-loaded plunger that applies force to the lower end of the hand when assembled. Out of sight on top of the trigger assembly is the cylinder stop. Above right: Tip of punch points to the area of the loading gate pivot screw head. This screw is tiny and is best left unmolested unless it is absolutely necessary to remove it.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Below left: Punch indicates the leaf spring which applies force to the loading gate to keep it in place when either open or closed. Note at the top of the loading gate slot in the frame there is a nickel-plated screw which retains the leaf spring. Again, removal of this screw is not recommended unless repairs require it. Below right: Closeup detail of trigger guard and lower frame showing the bottom leg of the V-spring in place in front of the trigger and the hammer rebound lever in place behind the trigger. Note the hook on the rear end of the trigger guard that mates in a recess in the rear of the trigger guard mortise in the frame.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

Below left: Punch indicates the leaf spring which applies force to the loading gate to keep it in place when either open or closed. Note at the top of the loading gate slot in the frame there is a nickel-plated screw which retains the leaf spring. Again, removal of this screw is not recommended unless repairs require it. Below right: Closeup detail of trigger guard and lower frame showing the bottom leg of the V-spring in place in front of the trigger and the hammer rebound lever in place behind the trigger. Note the hook on the rear end of the trigger guard that mates in a recess in the rear of the trigger guard mortise in the frame.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

Also shown is a screwdriver removing the hammer axis screw. Above center: Closeup of trigger assembly showing the hand and the coil spring-loaded plunger that applies force to the lower end of the hand when assembled. Out of sight on top of the trigger assembly is the cylinder stop. This screw is tiny and is best left unmolested unless it is absolutely necessary to remove it. work that needs to be performed requires their removal. When reassembling, there are several key points to remember.

Install the trigger first. Position the hammer forward such that its tail clears the frame at the rear of the Again, removal of this screw is not recommended unless repairs require it. hammer slot and that the hand is properly in its slot as the hammer is lowered into place in the frame. Reinstall and position the hammer rebound lever against the trigger prior to carefully installing the trigger guard. Engage the lip at the rear of the trigger guard into the mating recess in the frame.

With the V-spring in place, rotate the front of the trigger guard up and in place against the V-spring force. While holding the trigger guard, drive in the front retaining pin. It can help to use a small spring clamp with protected jaws to hold the trigger guard in place. At this point, using thumb force against the hammer as a surrogate mainspring, manipulate the action to ensure that the lockwork is functional, indicating that the internal components are assembled in their proper relationship to each other.

Parts for these H&A revolvers were hand fitted and there are precious few parts available, even from long-established gun parts vendors. Remove only what you must in order to complete the job, while keeping in mind that any parts you disturb may be damaged in the process, being old, brittle, cast, and stuck fast with a century of dried oil and schmutz. Again, it is recommended that you disassemble to clean and perhaps perform light repairs to restore an example H&A revolver to functioning—if not shooting—condition.

Caution the customer that given the H&A's cast iron frame, loose parts fit, likely worn condition, and the fact that all H&A revolvers were designed for black power loads, it is not recommended to fire them. AG

PISTOLS

Getting It Back

A Distinguished 2650 Club competitor's path to regaining championlevel skill and the guns (and gunsmithing) he used to do it.

BY ROBERT KOLESAR AUGUST 2020 ORIGINAL PP. 11-16

In 2013 I started shooting competitive Bullseye (National Rifle Association Precision Pistol) again after a decade of inactivity. Deployments and kids had taken up the time I needed for practice and shooting matches. Reluctantly, I had to leave the U. S. Army Reserve Competitive Marksmanship Program, which had picked up the tab for my guns, ammo, and shooting tours. I'd always intended to return to Bullseye, but my absence was longer than anticipated.

Due to not using my shooting skills for several years, I had to re-learn what I thought I "knew" and re-develop muscle memory and fundamentals. First priority was to figure out what my new goals upon my return would be. I already had pretty much accomplished what I wanted to, so I had to focus on different possibilities. I was also older than during my Both are 1911s that were tuned by AMU gunsmith Justin Mc Millan in Texas. The older 1911A1 National Match (bottom) is used as a backup gun.

Top is a .22 Marvel conversion, which is very popular now. Bottom is a .45 wad gun, used in both the Center Fire and .45 phases of the 2700 course. Shooting the same type of gun keeps things simple and makes it easier to transition from the .22 phase to the CF and .45 matches. Both wear Ultra Dot optics. peak years of competing. I realized that I might never be the pistolero I once was; this was supposed to be a pleasant return to a sport I loved, not an exercise in frustration.

So I dialed back on what was attainable and went for what I knew I could accomplish. I ended up concentrating on Civilian Marksmanship Program Service Pistol, plus getting NRA Revolver and CMP .22 Pistol Distinguished. A practice regimen was developed, and my second competitive shooting career was launched. The USARCMP graciously allowed me to return and shoot with the Service Pistol team, as long as my scores were at the level expected.

It took some work, but I was able to generate scores the team needed my first year back. I wasn't quite where I wanted to be, but I was on my way and shot with the Team my last two years in the Reserve. Bob decided to go back to the 1911 for CMP Service Pistol after retirement from the Army Reserve Service Pistol Team. Something I had to deal with almost immediately was equipment. Most of my gear had been turned in when I left the team years ago.

Guns were still available for issue, but I needed to test them for accuracy and reliability. This can be very time consuming, depending on the gun(s) you're working with. I also had my own guns, but they needed quite a bit of attention (more on that later). Ammo had changed since I'd left, both the type of ammo allowed and the brand we were issuing. I had to tailor the guns to the loads used, instead of the other way around.

I don't reload, so I needed to be sure my guns shot well and reliably with the issued factory stuff. Luckily, I had no problems accuracy-wise with the new Atlanta Arms .45 semi-wadcutter load, which proved to be more than adequate in both my personal pistols and the issued guns I received. The CMP no longer required 230 grain .45 ball ammo for Service Pistol events anymore, so logistics and testing was easier

GETTING IT BACK CONTINUED ORIGINAL PAGE 12

A good pistol to start with, having excellent sights and usually a decent trigger out of the box. It needs a tight bushing, rear lockup work, slide-to-frame fitting, and sometimes a trigger job to be Camp Perry-competitive, though. Top gun was built by Justin Mc Millan. Bottom pistol is Bob's old USAR-issued M9, tuned by Tony Kidd years ago. Both pistols are excellent shooters, grouping under 1.5" at 50 yards from a Ransom Rest.

The downside to an M9 is the expense, if you're a civilian. as both my semi-wadcutter .45 and .45 Service Pistol could now be used with the same 185 grain jacketed SWC at about 780 fps. A simple recoil spring change and I was back in business with the new, lighter load. I also caught a big break when being re-issued my Team handguns. I ended up signing for the same 9mm Beretta M9 that I had turned in before leaving the team.

This particular pistol was a jewel that shot into an inch at 50 yards from a Ransom Rest and had a superb roll trigger. It had originally been built by Tony Kidd when he was working for the Army Marksmanship Unit at Fort Benning. This one, built by Tony Kidd, shoots into an inch or so at 50 yards from a Ransom Rest. Ugly, but a shooting machine. Unfortunately, Tony isn't building match pistols anymore. A good revolver will have a 6" barrel, smooth action, and a post front sight.

Bob favors plain Pachmayr grips for comfort. Tony, who now concentrates on building custom Ruger .22 rifles in Texas, is one of only a handful of gunsmiths that can accurize an M9 properly, getting them to consistently shoot under 1.5" groups from machine rest at 50 yards. I decided to use an M9 for the Service Pistol instead of a 1911 for the remainder of my military shooting career. The transition from 1911 to M9 was not a problem; I actually enjoyed shooting the 9mm more than the .45.

The Atlanta Arms 9mm match ball load (115 grain) we used was developed and loaded for the AMU guns and shot well in several 9mms I fired. The 9mm definitely helped my transition back into the competitive game. Superb accuracy and reduced recoil is a good thing. .22 Pistols In NRA Precision Pistol, a standard 2700 aggregate of 270 rounds requires a .22 pistol for a third (90 shots) of the match.

When I started shooting for the military back in the late 1970s, the preferred .22s were the Smith & Wesson 41 and the High Standard 106/107 Military. Both are excellent, accurate pistols and are still seen on the line at major matches today. There are better guns though; shooters will use whatever gives them an edge. After using a model 41 S&W for many years I borrowed a Hammerli 208 and noticed a jump in my .22 scores.

It took some time (about half a shooting season) to get used to the Hammerli two-stage trigger pull, but I noticed a steady climb in my .22 scores as my shooting career progressed. The only downside to the Hammerli 208 is that they're now discontinued. If you find one, it'll cost you. Most folks that own one tend to hang onto them. Because I had returned my Hammerli 208 when I retired, I used my old M41 S&W .22 when I got back into the game in 2013.

My gun needed trigger and reliability work before I started shooting semi-decent scores again, and that downtime cost me good .22 scores most of the first season I competed. Not really a bad thing though, because I learned a great deal about M41s and .22s in general and how they function. Patience is a good thing to have because nothing comes easy in bullseye. A key problem in many .22 pistols (especially the M41) is extractor tension.

A worn extractor and/or spring are the culprits, causing the M41 trapped brass syndrome. Fitting anew extractor and spring will usually cure the problem. If you're shooting a

lot, check the extractor and change the spring every other year. Chambers need to be clean and lightly oiled (a touch of oil on the top round of the loaded magazine before insertion will work). Dirty magazines are also a universal issue; your magazines should be fitted to the individual gun, marked, and cleaned regularly. High Standard .22 pistols are very magazine-sensitive; newly purchased magazines need to be adjusted to the particular pistol.

In trouble-shooting a problem .22 pistol, always start with a thorough magazine strip and clean. Putting a dot sight (electronic red dot) is easy on the 41 and High Standard. The older guns need to be drilled and tapped. The easiest solution for the M41 is to buy anew barrel that's set up for a dot sight. Clark makes a nice one, ready for optics.

Anew barrel, drilled and tapped, is also available from the new High Standard Company in 22 with one side of the thumbrest shelf cut down, making it more comfortable to shoot left-handed (the author is a lefty). Modifications like this are common; personalizing your equipment is far more important than looks. Barrel is a cutdown S&W factory 7" with a Walther sleeve installed as an accuracy upgrade and a rail for ared dot electronic sight. Houston, Texas.

I had a custom barrel made for my gun by an Army National Guard armorer years ago that worked nicely. It was a cutdown 7" S&W factory barrel that had been sleeved and a rail attached for optics. Shooting a Hammerli or Pardini doesn't guarantee winning scores, but it helps. The downside to an expensive Euro pistol is finding someone who can work on it.

My best advice, based on past experience, is to wait until the CMP Nationals at Camp Perry or the NRA Nationals at Camp Atterbury and have one of the military team armorers fix it. It'll be free for competitors and done right. The manufacturer may or may not understand your problem or what you want in adjusting your trigger (try explaining what a roll trigger is to a factory service rep over the phone). Be careful who you let near your expensive, exotic pistol.

Also, most of the European guns can be set up with a factory scope mount. The Hammerli is a good one espe- Far 22 Distinguished match is fun to shoot and a challenge. Iron sights are mandated, along with a low-ready starting position in the sustained fire stages. There are a lot of good .22 shooters out there, so it's very competitive. The author used his old M41 with a 7" barrel.

This one was installed by Smith & Wesson years ago on Bob's .38. cially, as you don't need to remove the mount if you want to use your iron sights. Another option that isn't really expensive and has good factory service is having a .22 built on a 1911 frame. I tried this and it works well. Several top-tier shooters like Jim Henderson on the AMU team have used .22 conversion units. Most experienced 1911 gunsmiths can set one up and will understand the mechanics of tuning the trigger for Bullseye.

Both Marvel and Nelson have good track records for service and are usually available at the big matches to fix and adjust customer guns. I had former AMU gunsmith Justin Mc Millan build a Marvel conversion on a Caspian frame; it worked and shot well. The advantage to a .22 conversion is the grip and trigger reset feels the same as a 1911. Some shooters adjust the .22 trigger to the same weight as their .45 to keep things as close as possible from gun to gun. Not a bad idea.

I set my Marvel .22 at 3 pounds, which is pretty close to the mandated 3.5 pound trigger weight of a .45. Keeping it simple should always be your goal. Both Marvel and Nelson conversions can be purchased set up for either iron sights or optics. Shooting optics is the way to go if you want to win, unless you're shooting a match that dictates iron sights, such as CMP .22 Distin-

ARCHIVE IMAGE WITHHELD

ARCHIVE IMAGE WITHHELD

22 conversion on a Caspian steel 1911 frame by Justin Mc Millan. A cheaper alternative to a European .22 pistol that is still very competitive. Top is a High Standard Victor; bottom is a heavy-barreled S&W 41. Somewhat outdated, both pistols are still excellent choices, unless you're looking to win Olympic gold or Camp Perry. guished. It also levels the playing field for older shooters and makes them competitive with the younger crowd.

Lots of choices out there, but I like Ultra Dot products; it's what I'm used to after many years of use. Parts and service are available from Ultra Dot; they're at the National Matches every year to sell and service their sights. Centerfire Pistols Two-thirds of a 2700 (180 rounds) is fired with a centerfire pistol. NRA rules mandate a minimum .32 caliber cartridge for Center Fire along with a .45, both 90 rounds in a standard 2700 aggregate.

Most shooters use a .45 pistol for both as it's easier logistically with only one pistol to learn instead of two. These matches Thumb is high; pistol is gripped firmly, but not too tightly. Best analogy would be a firm handshake between friends. are usually three events total (.22, Center Fire, and .45) and makes for along day; kind of like a marathon with handguns. Let's talk about the .45. Like most shooters, I use one for both the CF and .45 phases.

I've had more than a couple dozen 1911s accurized for me, both by the Army and several civilian gunsmiths. Some shot better than others, but I learned something about accuracy and reliability from all of them. Accurizing a 1911 is settled science. It's been done by dozens of gunsmiths since the 1930s with varying degrees of success. Something that's not mentioned often when talking about pistol accuracy is the ammo. Ammunition, like the guns being used, has evolved and improved since early in the last century.

It was actually quite bad in the early days of competitive shooting. During the post-WWI years at Camp Perry, shooters were issued war-surplus .45 GI ball ammo that was corrosive. Target ammo (lighter bullets at slower velocity) was in its infancy. Jacketed semi-wadcutter (185 grain) ammo started appearing in the late 1940s to early '50s loaded by Winchester and Remington. Velocity was a little less (760-780 fps) than issue ball ammo, resulting in less recoil.

The big ammo companies concentrated on loading more accurate target ammo. The result was superb match accuracy from ammo that was never intended to be anywhere but on a battlefield. Coupled with improved weapons, shooters started setting records yearly at the big matches. After playing with an AMUbuilt .45, I decided to use a 1911 accurized by Larry Leutenegger on my second go-around. It shot the best in my testing with the Atlanta Arms ammo and my issued pistol was relegated to back-up status.

Before using the Leutenegger gun, I machine rested it at 50 yards, getting 10-shot groups of about 2". Not the best but still competitive. It should be noted that the Kart barrel in the pistol had in excess of 5,000 rounds through it by then… not bad for a possibly "shot out" barrel. I had intended to rebarrel it eventually but never got around to it because it shot well in the matches I fired. I'm a big believer in not fixing something that isn't broken.

Check your extractor for wear and tension if you've been away from shooting for awhile. Same goes for the firing pin spring and stop. Replace the spring as they're cheap and it's easy. Stops should fit snugly (not tightly) and have a slight bevel on the bottom. This aids in functioning; most NRA Open Division .45s (wad guns) are right on the edge of reliability, so every little bit helps.

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact **editor@gunsmithmag.com** and reference AG-1EF8137077-A2354-P15-F01. Know the rights holder? Please ask them to contact us.

AG-1EF8137077-A2354-P15-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact **editor@gunsmithmag.com** and reference AG-1EF8137077-A2354-P15-F02. Know the rights holder? Please ask them to contact us.

AG-1EF8137077-A2354-P15-F02

A big part of the expense in tightening the slide to frame tolerances of an M9. Barrel is machined to fit perfectly, without any movement, into the front of the Beretta slide. Too tight and the slide can crack or cause malfunctions; too loose and accuracy suffers. My .45 Leutenegger pistol was still tight but a few things needed to be done. I had Justin Mc Millan check the tolerances on my bushing and the slide-to-frame fit.

Slideto-frame tolerance should be about 0.002, which is snug but leaves enough room for a build-up of oil and residue. Bushing and barrel should be very tight (0.001). If your muzzle has any evidence of damage or wear, a recut muzzle crown of 11 degrees will definitely decrease your group size. If you need to replace the barrel, KKM is the way to go. Both the Army and Marine teams use them. Replacing a barrel can be a major undertaking; if The slide ejection port has been slightly relieved for enhanced reliability.

Rear sight is a Bo Mar, still considered the best rear sight in building a Service Pistol. you think you need anew barrel, do it before the season starts. Start checking your barrel regularly after 5,000 rounds of jacketed ammo. Keep a journal of each gun with the number of rounds fired and the lot numbers used. Check your trigger weight (3.5 pounds for a .45 wad gun) and make sure there's no hammer follow. A good trigger job is an easy task for a good 'smith, and it's not a major expense.

A good armorer will have a jig for doing a precise cut on the sear and hammer hooks. Perfect, full contact between the sear and hammer is needed for a safe, creepfree trigger pull. CMP Service Pistol My favorite event has always been shooting Service Pistol. To me, it's getting back to the basics of pistol marksmanship with a heavier trigger (minimum 4.0 pounds), no optics allowed, and no thumbrest target grips. It's basically the same gun a competitor would have shot in the 1920s or '30s.

It's a different and more difficult challenge. A Service Pistol match is usually short: a 30 shot National Match Course and it's over. Some places, especially Camp Perry and the new CMP Travel Games, will also have the 40 shot President's Pistol Course. Both are fun to shoot and make for a quick day at the range. For the 2013 and 2014 seasons I shot an issued, accurized M9 and loved it. One of my lesser goals was to make the President's Hundred cut at Camp Perry using an M9.

I had no problems shooting a qualifying President's Hundred score both years, even making the top ten, and doing very well in the National Trophy Team match with the Beretta. It's an easy gun to like. The M9 now holds all the national Service Pistol records. The downside to an M9 (at least for civilian shooters) is the expense. A reworked M9 will cost in excess of $2000, not counting the cost of the pistol itself. Lots of work needs to

ARCHIVE IMAGE WITHHELD

ARCHIVE IMAGE WITHHELD

It not only verifies build quality but also barrel accuracy. be done to make the Beretta competitive. Steel inserts are added to the frame rails, as well as adding an oversized barrel. Front and rear barrel lockup is critical; once done, the barrel shouldn't be removed from the slide. Trigger jobs (4.0 pounds) are more difficult than on a 1911; CMP rules state that the double action pull must work, though it's never used in a match. That complicates doing a safe, repeatable, match-grade trigger pull.

For all that expense you get a su- Ammo used was Federal commercial 230 grain match ball, not used anymore in competition. A softer recoiling load is approved now, such as 185 grain SWC. Many civilians use light-recoiling lead loads with a 200 grain SWC bullet at 750 fps. 22 shooter can buy is either Eley Tenex or RWS R50 with a very slight edge in accuracy usually going to Eley. Both loads are totally reliable and will easily stay well within the X-ring at 50 yards.

Expensive, but worth it. perbly accurate pistol at 50 yards that's also a joy to shoot in 25 yard rapid-fire strings. After retiring from the Team in 2014 I went back to the 1911 for Service Pistol matches. Both my 1911s needed work; my main gun got anew barrel (KKM), bushing and a refit. My backup gun (an older GI National Match pistol) got a complete trigger job, including new hammer and sear pins. Both pistols will hold 2" groups from a machine rest at 50 yards.

Revolvers Wheelguns are making a modest comeback in Bullseye. They're fun and cheap to shoot and many competitors have a revolver or two that can be used. The NRA sponsors the Harry Reeves Match, a revolver-only National Match Course. They run a Distinguished Revolver program shot on the National Match Course with "leg" points accumulated like the Excellence-in-Competition programs. 158 grain round-nosed ball or SWC lead is mandated for this one, which makes it interesting.

Best gun would be a 6" S&W K38 (M14 series) or a .357 Combat Magnum (M19). Both can easily be found on the used-gun market. Usually some minor trigger work will get you in the game and make you competitive. I shoot the timed and rapid fire stages double-action. It can be done, with practice. It's all about trigger control. The CMP is planning their own revolver events during their National Matches at Camp Perry. Details are evolving as of this writing, but it's safe to guess it'll be a National Match Course.

Shooting a revolver in Bullseye is mucho fun and easy to get started in. Final Thoughts Going back into competitive shooting was more difficult than I imagined; it was very much worth it, though. I was again shooting alongside people I knew and admired from years ago while proving to myself I wasn't a "has been" quite yet. Shooters tend to mature later than other athletes; if you work out for upper body strength and monitor your vision, you can be competitive well into your 70s and beyond.

Check and tune your guns regularly, lift weights, keep track of your vision, and you'll be a mortal threat to the youngsters when you step up to the line. Precision shooting can be an enjoyable lifetime passion. AG

TOOLS & FIXTURES

Chamfered Primer Flash Holes

In the modern realm of rifle shooting there would appear little remaining room for progress in the area of research and development… but we must keep on trying. Here's how an internally chamfered primer flash hole affects shooting performance.

BY NORMAN E. JOHNSON AUGUST 2020 ORIGINAL PP. 17-20

In ".224 Valkyrie Precision Problems" (August 2019) author Joe Carlos discusses the titular cartridge in detail. This prompted me to expound on the effects of the inner chamfered or beveled primer flash hole. In the text he mentioned he had not personally conducted any testing related to flash hole tools. He further stated that Sinclair International makes a tool that inserts through the case neck to chamfer the inside of the flash hole. Precision shooters claim this creates a more even powder ignition.

Some claim this tool results in more consistent velocities. All this strongly suggests further investigation in this area may be helpful to the shooter. Perhaps my more than 60 years of experience working with all aspects of the modern day cartridge may shed some light on this not-oft-discussed subject as well.

While I have been unable to solicit any reliable outside information on the subject of inner primer hole chamfering, the following research is largely that which I have previously worked with over an extended period of time, and now, more recently. Primer Function The primer consists of a relatively thin wall (0.015") brass cup containing an explosive material held by a paper disk and brass anvil. The firing pin compresses the primer composition between the anvil and the cup, causing it to explode.

Hot gases pass through the primer vents that are about 0.078" in diameter and 0.070" deep to ignite the powder. These primer hole dimensions pretty much hold true for all cartridges, large or small, including those termed magnums. These holes are close to the size of a number 47 drill bit, which is the same as a 5/64 SAE bit—both with a diameter of 0.078".

Shock wave energy ignition time, the interval between the firing pin striking the primer and when pressure of hot gases is high enough to start the bullet moving from the case mouth, is only about 0.0002 of a second. The reasoning on precisely how the bullet is released from the case following ignition varies somewhat. There is evidence to support that bullet release from the case neck takes place as hot gas pressure passes between the bullet and the case mouth, thereby releasing its hold on the bullet.

A small puff of gas at the muzzle immediately ahead of the bullet bears this out. Gas actually passes the slower moving bullet before its full diameter obturates the bore leade or throat. Bullets are sometimes seated beyond the case neck, directing pressure to the sides of the bullet equal to that at the base of the bullet. Still, gas escapes past the bullet, sometimes unevenly, causing bullet tilt. Overly firm bullet seating tension can also play apart, causing muzzle velocity to vary by as much as 60

CHAMFERED PRIMER FLASH HOLES CONTINUED ORIGINAL PAGE 18

The cartridge is placed on a square surface directly below a drill bit entering the case mouth. Precise chamfer depth is controlled by a graduated stop built into the milling machine to the nearest thousandth of an inch. Here it is set at 0.020 inch, the depth used by the author in chamfering flash holes. feet per second with a noticeable effect on accuracy.

Chamfering Inner Flash Holes The precise phenomenon surrounding cartridge ignition has been debated by shooters and even 7 drill bit passed through the case mouth to the sectioned case head in the chamfering process. As described in the article, a secondary stop is used at the case mouth attached directly to the drill bit.

If such a case stop is used, cases would all need to be trimmed to the exact same length for uniform chamfering. 020" chamfer depth using 59 degree No. 7 drill bit. ballistic experts since powder and primers have been invented, but there is no great mystery here. As a primer explodes, shock-wave energy is forced into the powder column through the primer flash hole. This small flash hole is quite uniform, about 0.075" diameter, thus directing the blast largely up the center of the powder column.

The energy from primer ignition tends to distribute or compress the loose or compacted powder to the front of the cartridge case, immediately followed by partial powder ignition. Peak pressure is achieved quite early in the movement of the bullet into the barrel.

However, a varying amount of the propellant bolus may follow the bullet down the barrel largely dependent upon cartridge configuration and volume, as well as the kind of powder and primer used and the bullet seating depth and seating tension within the case and clearly the position of the powder in the case. An inner beveled flash hole tends to allow the primer shock waves to be diverted peripherally and burn the powder more uniformly from the base of the powder column.

The angle and depth of the inner primer flash hole chamfer or bevel is important and here I will cover some of the work I have done in this area and the subsequent results. A standard SAE drill bit has a 59 degree bilateral cutting angle. I use a 3/16" or number 7 drill bit to form the chamfer inside the cartridge case, preferably anew one. This can beanew or fired case with the primer removed. Never attempt to chamfer a case that has alive primer in it.

Forming the chamfer is an easy procedure but there must be precise depth control of the drill bit as the chamfer is formed. Here's how I do it: The cartridge case is placed upright, regardless of caliber, on a solid block of metal squarely below a chucked drill bit. There must be a graduated positive stop on the milling machine or drill press graduated in thousands of an inch as a means of pre-

CHAMFERED PRIMER FLASH HOLES CONTINUED ORIGINAL PAGE 19

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact **editor@gunsmithmag.com** and reference AG-1EF8137077-A2355-P19-F01. Know the rights holder? Please ask them to contact us.

AG-1EF8137077-A2355-P19-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact **editor@gunsmithmag.com** and reference AG-1EF8137077-A2355-P19-F02. Know the rights holder? Please ask them to contact us.

AG-1EF8137077-A2355-P19-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact **editor@gunsmithmag.com** and reference AG-1EF8137077-A2355-P19-F03. Know the rights holder? Please ask them to contact us.

AG-1EF8137077-A2355-P19-F03

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact **editor@gunsmithmag.com** and reference AG-1EF8137077-A2355-P19-F04. Know the rights holder? Please ask them to contact us.

AG-1EF8137077-A2355-P19-F04

010" through 0.025" in 0.010" increments. A standard 59 degree cutting angle was used in forming optimal flash hole chamfer depth at 0.020" after hole contact. 6x44 SW- NEJ (top row) display the same degree of primer flattening with near full loads. Following a wide number of loads tested with many different cartridges, inner primer flash hole chamfering at 0.020" depth showed no increase in pressure signs over non-chamfered cases. cisely controlling cutting depth.

I would discourage the use of a hand drill to chamfer inner primer flash holes. In so doing you are left without precise depth control which is vital. A stop could be used attached to the drill bit in a hand drill but this may lack precision too, or the means of depth control could become altered, particularly 25-06 Remington cartridges display near quarter-minute accuracy while using both chamfered (left) and non-chamfered (right) flash holes.

Load used was 75 grain Hornady V-Max bullet, 48.5 grains IMR 4064 powder at 3440 fps chamfered and 3450 fps non-chamfered. All pressure signs were perfectly normal and uniform in these tests. A Model 700 Remington rifle with 26" Sendero barrel and 4-20X Sightron scope were used for these tests. 224 Valkyrie were the most revealing with chamfered and non-chamfered cases showing the accuracy performance between the two, shot on successive days.

As explained in the article, I used Federal cases with the drill bit set at a 0.020" flash hole chamfer depth. if case length varies. Both a chuck stop and a drill collar can be used together as a means of controlling chamfer depth where cases are at uniform length. Following extensive tests and evaluation I arrived at a good balance in flash hole chamfering and accuracy by advancing a 59 degree drill 0.020" following drill bit contact with the inner primer flash hole.

Flash hole diameters are close to 0.075" which finds the point of the drill bit flutes a few thousandths into the flash hole before the controlled 0.020" advance. A measurement across the perimeter of the chamfered flash hole will be very close to 0.150". This allows the widened primer flash to span a greater surface at the powder column base while still maintaining a solid flash hole web.

At the outset of the inner primer flash hole experiment, my primary objectives were to determine comparisons in grouping accuracy and bullet velocity and/or changes in the condition of the fired primers in both chamfered and non-chamfered cases. The recent outcome, as in past tests, proved most interesting with a number of different cartridges and loads.

For example, I recently conducted tests on the .224 Valkyrie, the cartridge critiqued by Joe Carlos in his August 2019 article. .224 Valkyrie Chamfering Tests While conducting tests on one of three chamberings for the .224 Valkyrie, I used Federal cases with the drill bit set at a 0.020" flash hole chamfer depth. Five-shot, 100-yard groups were shot with each bullet on successive days with flash holes

CHAMFERED PRIMER FLASH HOLES CONTINUED ORIGINAL PAGE 20

I designed the 5.6x44 SW-NEJ about 17 years ago. It is essentially a .223 Remington with virtually no taper and near square shoulder. This series of groups, shot on 10-8-19 and 11-9-19 with the author's 5.6x44 NEJ-SW, clearly show the chamfered flash hole advantage. Results are with a Pac-Nor 1-8 twist barrel on a Model 112 Savage rifle and 73 grain Berger bullets. Non-chamfered 24 grain Varget gave a 0.520" average. Chamfered 24 grain Varget yielded a 0.449" average.

On 11-9-19 non-chamfered groups with Berger 73 grain bullets ahead of 24.5 grains 8208 powder grouped at 0.350" and 0.330". Chamfered flash hole groups with the same components grouped at 0.140" and 0.155". 224 Valkyrie. As velocities were increased, these proof loads served in closely comparing possible elevated pressure differences between chamfered and non-chamfered cases. No significant pressure differences were noted as a result of these carefully monitored tests.

Accuracy came out ahead on most of the chamfered loads, even during the proof fire process, as detailed in the article. both chamfered and un-chamfered. A model 40X Remington rifle was used with a 1:7 twist, Criterion 26" barrel (CriterionBarrels.com, and a Sightron (Sightron USA. com, S-TAC 4-20 scope with 1/4 minute dot—a setup capable of extreme accuracy. There were chamfered flash holes on the four upper groups, with the four lower groups non-chamfered.

The chamfered flash hole groups edged out the non-chamfered in each case. Velocity remained quite uniform with the .224 Valkyrie and other cartridges tested chamfered versus non-chamfered. This is likely to vary with cartridges and load, at least to some degree. Sierra (SierraBullets.com, 77 grain Tipped Match King and 73 grain Berger (BergerBullets.com, bullets were used in these tests. Following the .224 Valkyrie, I conducted similar tests on a cartridge that I designed 17 years ago—the 5.6x44 SW-NEJ.

This is essentially the .223 Remington with virtually no taper and near square shoulder. I used a special reamer made by Clymer Tool (ClymerTool.com, A standard .223 cartridge can be fireformed in this chamber as it has the same headspace. It is a very efficient cartridge capable of extreme accuracy. As the photos show, tests were conducted on both chamfered and non-chamfered cases—those shown with a 73 grain Berger boat tail target bullets and three different powders: Hodgdon Varget, Norma 202, and IMR 8208 XBR.

Results were impressive. I used a Savage Model 112 Target rifle with Pac-Nor (Pac-Nor. com, 28-inch Super Match 1:8 twist barrel and Sightron 4-20X S-TAC scope with 1/4 minute dot on a Talley (Talley Rings. com, Picatinny Rail Mount—a combination capable of extraordinary accuracy. A look at the targets dated 10- 08-19 show an accuracy average of chamfered cases at 0.449" and 0.520" for the non-chamfered.

Velocity average for the chamfered cases was 2745 fps compared to 2762 fps non-chamfered, averaging out the two powders. The targets dated 11-9-19 using IMR 8208 powder and 73 grain Berger bullets are most interesting. Using the same rifle, the non-chamfered groups measured 0.350" and 0.330" while the groups with chamfered flash holes measured 0.140" and 0.155".

The trend toward improved grouping with properly chamfered cases appears to be real enough, but it requires a highly accurate rifle and well thought out loads to prove it. From the outset, working with the chamfered cartridges beyond that of merely cleaning up the flash hole, I was constantly vigilant of untoward signs of pressure. It would appear that an internally chamfered flash hole would tend to funnel internal pressure retrograde as the primer shock wave (Continued on page 22)

energy is reversed by the reversal in chamber pressure. While conducting a great number of carefully controlled tests on chamfered and non-chamfered cartridges capable of generating relatively high chamber pressures, pressure signs remained essentially normal and quite unchanged between the two. This included many different chamberings and manufacture while closely observing and noting all the typical signs of elevated chamber pressure.

While accuracy was my primary objective in these flash hole chamfering tests, I did shoot a representative number of proof fire loads with various cartridges. These included my standard 0.020" depth flash hole chamfering while approaching and sometimes exceeding maximum loads listed in reloading manuals. The chamfered and non-chamfered proof loads remained quite close together with emphasis on the typical pressure signals. A good example is the proof load series on the .224 Valkyrie.

Here I used a premium 1:7 twist Criterion 26" medium heavy barrel on a Model 40X Remington rifle with a Sightron 6-24X scope, Hornady 75 grain BTHP Match bullets, along with Varget powder and Remington Bench Rest primers. Target grouping was also recorded. I referred to the Hodgdon 2019 Reloading Manual as a guide for load selection, which listed the Hornady 75 grain bullet and Hodgdon Varget powder. The targets will show the loads used relative to velocity and grouping… there were no compromises.

While closely observing pressure signs, I exceeded the Hodgdon maximum of 25.5 grains of Varget at 2853 fps by 1.5 grains. Here, 26 grains produced 2940 fps and 27 grain produced 3051 fps. Visible primer extrusion appeared around the firing pin at 26 grains which increased slightly at 27. This was very similar when comparing the chamfered cases to those nonchamfered. As the targets show, the chamfered loads proved more accurate despite the conditions.

When asked if inner flash hole chamfering is beneficial or recommended for all handloaders, I would have serious reservations. Hunters, aside from those shooting at extreme ranges, may derive little benefit. Benchrest shooters or long range target shooters do stand to gain by it, as would varmint hunters shooting at extended ranges. If you have a really accurate rifle capable of sub half-minute accuracy you would stand to benefit the most by properly controlled inner flash hole chamfering.

It could mean the difference between winning and also-ran in a Benchrest match. I would hesitate to encourage those lesser experienced handloaders, or those lacking at least some machining ability, from delving right into inner flash hole chamfering. For those active and knowledgeable in precision shooting and handloading, the benefits appear almost certain. AG

MAINTENANCE & REPAIR

ACOG Maintenance

Simple maintenance checks and operation of Trijicon's Advanced Combat Optical Gunsight.

BY STEPHANIE A. MARTZ AUGUST 2020 ORIGINAL PP. 21-22

The Trijicon Advanced Combat Optical Gunsight, also known in the Army and Marine Corps as the M150 Rifle Combat Optic, is a durable and trustworthy optic. However, there are a couple of ways to ensure that this piece of equipment is kept working to standard. The Mount Often times the ACOG will be mounted with a TA51 mount to a 1913 Picatinny rail on either a M4/ M16 or a M249 and the parts of the mount need to be tight. The base of the ACOG is critical for ensuring the optic stays tight inside the housing.

If loose, the optic will move forward and back during operation. It is especially critical to check for looseness if mounted on a M249 due to heavy recoil. If it is, apply a drop of blue Loctite to the two base screws and use a screwdriver to tighten until snug. For military-issue equipment the only authorized Trijicon's ACOG is the most common magnifying optic in the United States military inventory. compound is Sealing Compound (Loctite), 2 Type and N Grade Blue Thread Locking Compound.

The front of the base should be in line with the front of the locking interface. To properly secure the interface to the rail, ensure that the locking studs are actually in a rail slot and that the interface clamp is not tilted but securely laying on the edge of the rail. Note, it is possible to mount it with the locking bar sideways. While applying forward pressure on the optic, tighten to finger pressure only, then use a screwdriver to tighten a quarter of a turn more. Do not overtighten.

If your optic is not maintaining a zero, a loose mount and proper mounting is the first thing to check. Verify both housing screws and locking knobs. Return to Zero Although the TA51 mount does not have a return to zero knob, there are ways around that to ensure Far

screws and interface. This will allow you to tighten the optic back on to the same tightness after returning it to the correct slot after removal which is critical to maintaining zero. Fiber Optic Light Collector The fiber optic light collector on top of the ACOG is filled with tritium that collects ambient light, allowing the reticle to be brighter. Many times during daylight hours operators will put tape over the light collector to dim the brightness and allow a more crisp reticle.

However, doing this can cause damage to the glass from the tape residue. If you want to dim the reticle and prevent the ACOG is mounted back to the previous zero set. To do this, after gaining a proper zero, use a paint pen to mark which rail slot the optic is in and mark the locking blooming, put apiece of paper under the tape to keep any residue off the glass. Do not attempt to scrape anything off of the glass. If the light collector is damaged it could allow tritium to leak which is very dangerous.

It also deadlines the ACOG if the collector is so badly damaged that it no longer collects light. To check for operation, go into a dark room and see if the reticle is still illuminated. Operator Inspection These easy inspections and maintenance techniques will ensure that your equipment remains in service for as long as possible and can be done by all levels of experience. You are responsible for your pieces of equipment and good practices like these will ensure that no negligence is found. AG

MAINTENANCE & REPAIR

Reader Forum

BY AMERICAN GUNSMITH EDITORS AUGUST 2020 ORIGINAL PP. 23-24

Shotgun Repairs I have an Ithaca-Lewis 12 gauge hammerless side-by-side shotgun (S/N 105XXX) which dates to somewhere around 1904. I would like to clean up the inner works and possibly replace parts that might need replacement. I have scoured the Internet looking for a schematic and/or an article regarding the detailed breakdown of the gun. Then the April 2020 issue came out with the "Ithaca Flues Shotgun" article. Does the Flues inner works resemble those of the Ithaca-Lewis? From Sergey Lyalko.

The Ithaca- Lewis model was introduced in 1901, replacing the Crass model. The major difference between the two was the double-bolt (bottom and rib extension) unlike the Crass model with one underbolt. Other parts and the lockwork were identical. These pictures of the Crass model parts (top) and Lewis parts show the differences.

The Flues model appeared in 1908 and was different from the Lewis in that it had a tree-bolting system (underbolt and two bolts on the rib extension) with the major difference being the coil mainsprings. These differences are insignificant for disassembly and reassembly. Keeping Safety First On page 22 of the May issue, the right hand picture of the screwdriver is incorrectly identified. It is an electrician's insulated screwdriver. The tip is not replaceable.

Wayne Shattuck Shotguns I'm looking for information on C. S. Shattuck shotguns. A customer brought one in for repair. His interest is reenacting and wants to shoot only blanks. The shotgun is missing the piece that cocks the hammers when the gun is opened. If I knew what it looked like, I could probably make one from scratch but I cannot find any schematics for it. Do you have such diagrams or can you suggest a place to find them? What historical information do you have? "Ranger" Doug From Mark Hollensen.

Some historical information on Shattuck shotguns. The C. S. Shattuck Arms Co. of Hatfield, Massachusetts was in business 1878 to 1908. In 1875 Major Charles S. Shattuck and Andrew Hyde started a pistol manufacturing business in Springfield, Massachusetts. In February of 1877, Hyde and Shattuck brought their Springfield pistol manufacturing business to Hatfield and went into a partnership with Mrs. Mary D. Porter in the Thomas Meekin sawmill on Prospect street, formerly the Crescent Pistol Co. established in 1874.

Shattuck possibly also had, concurrently or otherwise, a gun shop on Bridge street in Hatfield but the dates are unknown. In 1878 Mrs. Porter withdrew her partnership and the business was continued by Hyde and Shattuck. In 1880 Shattuck bought out Hyde and continued the factory alone, turning out many revolvers. Soon after he began to make single-barreled breech-loading shotguns and then double-barreled shotguns. Large quantities of both were made, averaging for a time 15,000 guns per year.

The gun shop was burned in 1881 and was immediately rebuilt on the same site. The manufacture of these guns was abandoned just before going out of business, with the last design made being a fourshot pistol but for how long is unknown. Dan Major Charles S. Shattuck served with the 6th Vermont Infantry in the Civil War and later lived on Main street in Hatfield. He returned at least once to Vermont for a military reunion. Shattuck was best known for inexpensive handguns and single barrel shotguns.

Their single barrels are valued from $35 to $150 and double barrels $100-$400 depending on condition. The 8 bores may command more. Shattuck used companies like J. P. Lovell Co. of Boston as distributors. This shotgun appears in a 1887 J. P. Lovell Co. catalog under the model name "American Trigger action". Shattuck made single and double barrel shotguns with and without hammer using Andrew Fyrberg's patent (498,427, May 1893) using Champion and Shattuck's Perfection service marks.

The Side Hammer Model in 10 and 12 gauge with a 30" or 32" twist or steel barrel was made from 1878 to 1886. The Old Model Side Snap in 12 and

16 gauge with 30" or 32" twist or steel barrels was made from 1880 to 1890. The American Trigger Action model was made from 1880 to 1904 and at least 961 guns were manufactured in 8, 10 or 12 gauge and 28", 30", 32", 34", 36", or 40" twist barrels, with and without a forend. Weight was over 13 pounds and called a “Punt Gun”. The Ring Trigger Opening Model in 12 and 16 gauge with 30" or 32" twist or steel barrel was made from 1890 to 1909.

The Hammerless Single Barrel in 12 and 16 gauge with 30" steel barrel was made from 1887 to 1909. The New Model Side Snap in 12 gauge with a 30" twist or steel barrel was made from 1890 to 1909. Markings on observed specimens include “C. S. Shattuck, Hatfield, Mass. American”, “London Twist-American”, “C. S. Shattuck, Hatfield, Mass”, “Hyde & Shattuck Springfield, Mass”, “Leager”, and “Perfection C. S. Shattuck with Pat’d Jan. 5, 1897”.

I don’t have a schematic or disassembly resource for any of these guns and am not sure where to find one. Even a patent search turned up zilch. One thing known is that these guns were strictly blackpowder and should or post a letter to Falls Church, VA 22041. For subscription questions or mailing problems contact American Gunsmith

SEARCHABLE ISSUE RECORD

Archive index

American Gunsmith

The complete searchable archive of a technical journal devoted to craft, repair, maintenance, machining, and restoration.

GUNSMITHMAG.COM · EDITOR@GUNSMITHMAG.COM