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INSIDE THE ARCHIVE

.223 VERSUS 5.56

BOYDS GUNSTOCKS • TAURUS G2 PISTOL IMPROVEMENT • SAVAGE 340 SMOOTHED • REMINGTON 1100 REPAIR

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 191

DIGITAL ARCHIVE EDITION

Preserved for the bench.

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PEOPLE & COMPANIES

Boyds Gunstocks

BY AMERICAN GUNSMITH EDITORS NOVEMBER 2019

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Boyds expanded their stock offerings by adding new bottom metal for AI-style magazine Ruger American Rifles. Ruger released the AI-Style magazines for Ruger Precision Rifle and Gunsite models in 2017 and these precision-style magazines quickly made its way into a few of the popular American Rifles, including the Predator and Go Wild models chambered in .308, 6.5 Creedmoor, and other popular short-action calibers.

These components are black anodized, CNC-machined aluminum (bottom metal and trigger guard) with the magazine catch polished, CNC-machined aluminum to allow for a tight grasp on the magazine. Designed to fit Boyds stocks without any fitting or alterations, the bottom metal kit also allows other Ruger American rifles to be converted to use Ruger's AI-Style magazines. Boyds also added stocks for the T/CR22 is Thompson/Center's semi-automatic .22 rimfire rifle.

The T/CR22 has an integrated Picatinny rail section and fiber optic front sight that adds modern features to a recognizable design. Boyds offers nine different stock shapes for the T/CR22, from the modular At-One stock with push-button adjustability to a more traditional Monte Carlo-style Rimfire Hunter stock. These stock

models can be customized from 14 different colors and several styles of laser engraving. There are also stock options for T/CR22 rifles with 0.920 bull barrels.

Gunstock Configurator Boyds also offers many options for their hardwood gunstock line, including choices of traditional hardwoods such as American black walnut and maple along with many different colored laminate combinations. Laser engraving, custom grips, custom length of pull, custom recoil pads, and custom forearm tips are additional options that can be chosen for some models.

The popular At-One adjustable stock comes standard with pushbutton length of pull and comb height adjustment to all the stocks to fit a variety of people and shooting situations. The Boyds Gunstock Configurator (BoydsGunstocks.com/productconfigurator) provides configuration in three steps.

Start by choosing the make, model, and action of your firearm, then choose the desired gunstock shape, and finish by selecting the available gunstock options, such as wood, finish, length of pull, recoil pad, tip, grip cap, spacer, laser engraving, and adjustable comb. For more information, contact Boyds Gunstocks (BoydsGunstocks.com).

PISTOLS

Taurus G2 Pistol Improvement

These inexpensive handguns can be a good choice, especially with the modifications and attention outlined here.

BY ROBERT K. CAMPBELL NOVEMBER 2019

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Among the most popular Taurus International handguns of the previous decade are the PT111 Millennium G2 and G2c series. I have tested these handguns extensively and have a generally favorable opinion of them—at least related to the price point. However, nothing is perfect and these handguns like most inexpensive handguns have their share of breakage. This seems true of the 9mm and .40 versions. Common sense tells us the .40 has more momentum but either handgun may show up at the shop for similar complaints.

The improved Taurus Millennium G2c may address most of these problems. As one example, an early model Taurus PT111

Millennium was examined with a dead trigger. The owner had been in a shooting session and had fired perhaps 50 rounds in the pistol. The pistol's lifetime round count, he estimated, was 250 rounds. The trigger was dead, with no movement under pressure; it simply hung in its midway travel point. The pistol had fired and the striker had cocked for the following shot, but the pistol would not fire again.

The shooter had safely unloaded the pistol but it could not be disassembled as the trigger could not be convinced to release the striker. The solution was to lock the slide to the rear and disassemble the slide by moving the slide plate and then removing the striker.

After removing the rear slide plate cover and removing the striker the pistol was decocked and disassembled in the normal manner by taking the slide off the frame.

This rear plate is plastic so care was taken in the removal. 40 is an acceptable defensive firearm but could stand some improvements. The problem demanded some investigation and a hard look at the internals of the handgun. After this initial disassembly I found the rear part of the trigger bar, the section that meets the sear, was damaged. The very end had snapped. Taurus pistols have a lifetime warranty and it isn't any problem to

TAURUS G2 PISTOL IMPROVEMENT CONTINUED

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There are no discernible tool marks. send them back, although there is often a four to six week stay. So, the owner had me replace the trigger bar. It is very simple and straightforward and required less than an hour of work. This prompted me to examine several PT111 G2 pistols at a friend's shop. The result was interesting. As many of you know the PT111 G2 is in anew generation known as the G2c. The G2c is an improved pistol in most regards.

The most notable difference is that the slide is no longer finished in a bright blue but rather a dull matte finish. The pebbling of the grips is different and the trigger safety bar is now solid rather than a hollow design. This would seem to be a more robust design. Looking over several Taurus G2type handguns I took a hard look at the trigger bar. There seemed to be room for improvement.

Note, this type of work may void the generous Taurus warranty but it also may improve the pistol's long term reliability and function. The trigger bar is between the trigger and the sear. Pressure on the trigger is relayed to the

trigger bar and the trigger bar trips the sear releasing the sear which in turn releases the striker which is under pressure from the striker spring. I think that the design will benefit from the trigger bar being modified in order to strike the sear more squarely.

The tip of the trigger bar that strikes the sear can be bent over a bit so that it strikes the sear squarely. This is among the very few gunsmith operations in which a pair of needle nose pliers is the proper tool. The original design is at an attitude that allows the trigger bar to contact friction between the sear and mechanism support. Another interesting situation that occurs fairly often with the Taurus PT111 G2 is a well-defined click in the trigger action as the trigger is manipulated.

The Taurus features a blade in the trigger face similar to the Glock pistol that prevents lateral discharge if the trigger is pressed to the rear from the side. The safety lever must be pressed flat into the trigger. This makes for a safer system, especially coupled with the pistol's manual safety. The spring tension on the

safety lever is loaded to prevent lateral discharge and sometimes causes the trigger to rub against the safety lever. The safety lever tends to rub when it retracts.

This often results in an audible click. When the handgun behaves in this manner, turn the handgun upside down for an examination. (Be certain the pistol is triple checked and that it is unloaded.) With the pistol upside down examine the trigger lever or trigger blade as it retracts under pressure. You should see the hook on the safety catch of the trigger. There is a slight edge on this hook. By carefully polishing this edge the action becomes smoother.

Do this with a proper, very thin file or screwdriver wrapped in fine grip sandpaper. Magnifying glasses are needed for this type of work. Be certain the shooter is properly pressing the trigger lever and not simply pressing the side of the trigger. The lever must be properly depressed to release the trigger and fire the handgun.

TAURUS G2 PISTOL IMPROVEMENT CONTINUED

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After working through some of the early Taurus G2 pistols I discovered several complaints concerning the magazine latch. When an unloaded magazine is in place the catch is very difficult to actuate. The slide lock is rather heavy and may bind. By looking at the receiver from above with the slide removed, you may see the tip (toward the muzzle) of the slide lock. It may bind on the frame and even the magazine. Carefully polish and shape the magazine latch.

By addressing the tip of the slide lock, the action becomes much smoother. Those who have addressed similar issues with the 1911 Government Model will be well equipped to perform this operation. The drill is similar. Modify slowly until the action is smooth and crisp. Disassembly isn't required. The trigger bar sometimes binds on the polymer frame.

If you remove the slide and hold the frame in the right hand and keep the frame (receiver) perpendicular to the line of sight, you should see a slight gap between the trigger bar and the right hand side of the frame. There is enough room to slip a very thin screwdriver, file, or other thin, stiff tool. The trigger bar

may be carefully polished at the end of the bar toward the muzzle where the trigger bar meets the end of the trigger. A device with apiece of sandpaper on the end may be used.

This action results in a smoother movement and in the end the trigger action will operate more smoothly after this work is done. There is a feeling in the trigger action that lacks smoothness and is addressed with the outlined technique. Another shooter brought a pistol in and did not like the feeling he described as "notches in the action." This is another thing altogether. When the trigger is moved to the rear and the trigger bar moves, at some point a hook reaches what some call the striker block actuator.

As the hook interfaces with the striker block actuator there is some roughness in all pistols I have examined—and more in others. All striker fired pistols operate in a manner similar to the G2c. In this particular pistol the hook contacts the striker block actuator and moves it to the rear, breaking the striker against the striker spring and firing the pis-

tol. While the trigger bar's polish results in greater smoothness, the notch-click effect must be addressed in another manner.

If properly done the result is a much more precise feel. The striker actuator is fairly rounded. It may be polished around the edges and made much smoother. A caution is that it seems possible to reduce friction to the point that the striker may not strike the primer with enough of a blow to properly ignite with consistency. The surface must not be rounded to the point there is no friction. After all, the action works by an interface that involves a certain amount of friction.

The Taurus G2 and G2c pistols are affordable and seem reliable. The operations outlined here will result in a smoother action and one that makes a trained shooter more capable with his chosen handgun. By reducing wear, especially eccentric wear, we may make for a handgun that will be subject to less wear as well as being smoother in action. That is worth the time and effort. With aforethought and study the time spent on each individual handgun is minimal for the improvement realized. AG

PEOPLE & COMPANIES

Savage 340 Smoothed

Features that made the Savage 340 inexpensive and popular also made the bolts sticky. Here's a simple fix that markedly improved the bolt manipulation of one Model 340 chambered in .30-30.

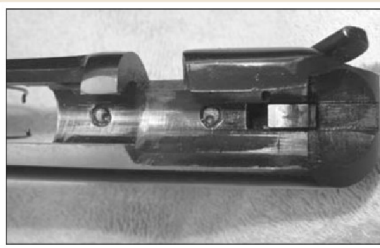
BY BRIAN R. SMITH NOVEMBER 2019

ORIGINAL PP. 6-8



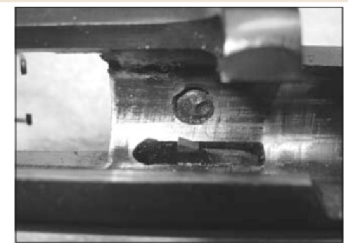
Above: The Savage 340 and its Stevens-branded relatives ushered in the post-WWII era of inexpensive factory-made bolt action hunting rifles offered in contemporary popular varmint and medium game cartridges.

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Below left: Savage 340 boltway channel showing rough machining marks and irregular finish wear, the staked ends of the two trigger group mounting screws in the center of the channel, and the sear at the right of the channel. Most 340s can benefit from light polishing of the channel. Below right: The spring-loaded pivoting ejector shown peeking up through its slot in the receiver tube. This particular ejector had a very sharp tip that caught in the circumferential gaps between the bolt components, causing the bolt to "hang up" during rearward and forward travel.

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The Savage Models 340 and 840, and the Stevens 322 and 325 before them, were value-priced, basic, bolt-action small game hunting rifles in their time. Chambered for then-popular varminting cartridges such as the .22 Hornet, .222 Remington, .225 Winchester, and the venerable deer cartridge, the .30-30 Winchester (.30 WCF), Savage-Stevens turned these compact boltguns out by the tens of thousands, later adding the .223 Remington chambering.

There were letter suffixes appended to model numbers to denote changes and different levels of "trim" and features. An examination of the myriad models are outside the scope of this article. These rifles were popular and long-lived for several reasons: First, they were inexpensive. Second, being compact, they were well-suited to hunters of smaller stature. Third, they were generally accurate. Finally, they offered detachable magazines. Most 340s can benefit from light polishing of the channel.

This particular ejector had a very sharp tip that caught in the circumferential gaps between the bolt components, causing the bolt to "hang up" during rearward and forward travel. for convenience and safety.

In fact, until the introduction of low-cost bolt action hunting rifles such as the Ruger American, Remington 783, and Savage's own Axis, here in north central Pennsylvania examples of the 340 family of rifles frequently commanded prices ranging from \$375 at the low end to \$450+ depending on the type of scope fitted to a Savage/Stevens 340 clone of a particular chambering. The little Savages are still in relatively high demand.

I had a high school friend whose father owned one hunting rifle and he took everything from woodchucks to coyotes to turkeys to deer with his small Savage in .222 Remington,. I wouldn't recommend the .222 as a deer cartridge but Bob's father, a man of small stature, was "Mr. Shot Placement" for as long as he lived. He was the epitome of the old saying, "Beware the man with one

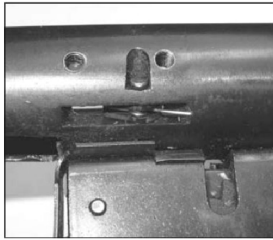
gun; he likely knows how to use it." The 340 and its variants were not particularly sleek or handsome.

Scoping one generally meant drilling and tapping for a Weaver No. 1 base, the characteristic side mount setup that is so prevalent on these small Savages. It was no Model 70 or 700 BDL but the 340 wasn't intended to be. In fact, the small Savage/Stevens centerfire boltgun was in many ways responsible for Remington introducing the Model 600/660, another lowcost short-action alternative with design features that are nowadays referred to as "distinctly mid-century modern" in appearance.

Being inexpensive, the 340 and its family made extensive use of stampings and wide tolerances such that costly precision hand finishing and fitting of parts was not required. Anyone who has handled a 340 or clone and has viewed the receiver boltway with the bolt removed can attest that "fit and finish" were not in the 340's production process description. The tooling marks are reminiscent

SAVAGE 340 SMOOTHED CONTINUED

ORIGINAL PAGE 7



Above left: Since a fair number of the inexpensive 340-family rifles are scoped with a side mount employing the ubiquitous Weaver #1 base, before the ejector pin can be withdrawn and the ejector itself removed, the scope base requires removal of its four mounting screws. Above right: With the scope base removed, the ejector can be pivoted into the receiver boltway to remove spring tension and the ejector pivot pin head grasped with finepoint pliers or pried up with a thin-bladed straight screwdriver. Pay attention to the orientation of the ejector spring for reassembly.

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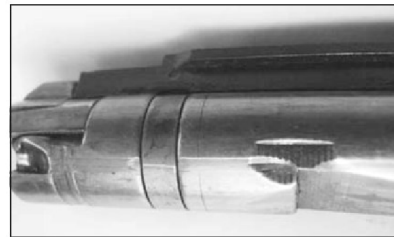
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ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Below left: With dozens if not hundreds of cycles of the bolt on this Savage 340, the sharp ejector tip wore a scratch-like track in the bolt. Light polishing of this "wear track" with an abrasive-loaded rubber wheel combined with forming a slight radius on the ejector tip eliminated the owner's complaint of "stickiness" of the bolt during manipulation. Below right: The ejector removed and shown with its business end at the upper left. The sharp pointed tip was the main culprit. As the front face of the ejector contacts the cartridge case head, the tip could be rounded slightly without detriment to case ejection and rifle function.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Below left: With dozens if not hundreds of cycles of the bolt on this Savage 340, the sharp ejector tip wore a scratch-like track in the bolt. Light polishing of this "wear track" with an abrasive-loaded rubber wheel combined with forming a slight radius on the ejector tip eliminated the owner's complaint of "stickiness" of the bolt during manipulation. Below right: The ejector removed and shown with its business end at the upper left. The sharp pointed tip was the main culprit. As the front face of the ejector contacts the cartridge case head, the tip could be rounded slightly without detriment to case ejection and rifle function.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

Pay attention to the orientation of the ejector spring for reassembly. of "last ditch" WWII Axis weapons more than postwar USA firearms manufacturing expertise. The bolt itself is a composite of essentially two main pieces, one with the bolt handle attached, the other containing the bolt head, a stamped spring steel extractor, two stamped spring steel gas shield retainers, the gas shield, cocking piece, firing pin, firing pin spring, and a few other miscellaneous assembly pins, clips, and retainers.

There are a number of transitions between these circu- Light polishing of this "wear track" with an abrasive-loaded rubber wheel combined with forming a slight radius on the ejector tip eliminated the owner's complaint of "stickiness" of the bolt during manipulation. The sharp pointed tip was the main culprit.

As the front face of the ejector contacts the cartridge case head, the tip could be rounded slightly without detriment to case ejection and rifle function. lar/cylindrical main components, the outside diameters of which are technically the same. In practice, there is con-

siderable variation in the ODs of the bolt body, bolt head, gas shield clips, extractor, etc.

There are varying gaps between these components as well, and the variation in bolt component OD and gaps between the components contribute to the basic "stickiness" of the 340's bolt when manipulated. The previously-mentioned roughness of the receiver boltway definitely contributes to the 340's cranky bolt, but in the case of one particular 340 chambered in .30-30, the springloaded pivoting case ejector was the main culprit.

Specifically, the nose of the ejector formed an extremely sharp angled tip, sharp enough to inflict puncture or laceration wounds if not careful. This extremely sharp ejector tip contacts the outside diameter of the bolt assembly in a thin line, catching on the gaps between the various bolt components, and causing bolt sticking. The problem is exacerbated by the various bolt components having slight differences in outside diameter.

This particular .30-30's bolt was so prone to sticking that prior to arrival on my bench, the owner would close the bolt by pressing directly on the rear of the cocking piece with

his thumb, then rotating the handle down to lock the action closed. If trying to close the bolt using just the handle, the slight torque created by the bolt handle would cause the bolt to bind with the ejector tip catching in the many grooves between bolt components.

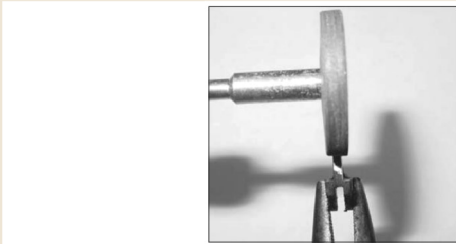
Always a proponent of defining the problem before planning the solution, I removed the bolt and disassembled the rifle sufficiently to remove the ejector, then reassembled the rifle and reinstalled the bolt. There was an immediate improvement; a marked decrease in the stickiness of bolt movement in the receiver boltway with the ejector out of the picture.

The bolt's feel wasn't that of a jeweled bolt, or even that of a No. 4 Mk 1 Enfield or a Krag, but the 340's bolt did not act as if wedged in place when an attempt was made to be manipulated by the bolt handle. The bolt was again withdrawn from the action and laid on a bench towel under the work light. The area of interest was the wear track made by the ejector tip on the bolt assembly, and this was clearly evident.

Taking up a dental pick, I drew then pushed the pick's tip across the bolt assembly with the pick acting as a

SAVAGE 340 SMOOTHED CONTINUED

ORIGINAL PAGE 8



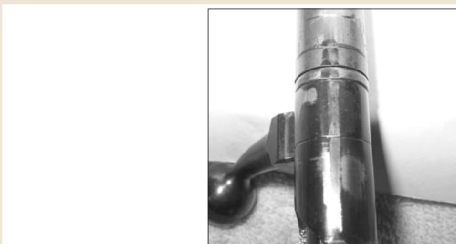
Above left: With the ejector securely clamped in locking-jaw pliers, an abrasive rubber wheel was used to slightly round the ejector tip by polishing away the sharp point. Above right: Polishing process of the ejector tip. Polishing is emphasized; not much metal was removed, as the tip was lightly radiused to more easily slide across the bolt's features.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Above left: With the ejector securely clamped in locking-jaw pliers, an abrasive rubber wheel was used to slightly round the ejector tip by polishing away the sharp point. Above right: Polishing process of the ejector tip. Polishing is emphasized; not much metal was removed, as the tip was lightly radiused to more easily slide across the bolt's features.

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Right: The bolt was polished in the ejector track, from the clearance cut at left, across the guide rib collar, and into the ramped notch in the bolt face. The objective was to have a rounded ejector tip ride easily across the various bolt components and their gaps that previously caused the ejector to catch and the bolt to stick. Far right: The 340's sear also traverses its own obstacles on the bolt assembly as seen in the finish wear track. This wear track was also polished with a rubber abrasive wheel.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Right: The bolt was polished in the ejector track, from the clearance cut at left, across the guide rib collar, and into the ramped notch in the bolt face. The objective was to have a rounded ejector tip ride easily across the various bolt components and their gaps that previously caused the ejector to catch and the bolt to stick. Far right: The 340's sear also traverses its own obstacles on the bolt assembly as seen in the finish wear track. This wear track was also polished with a rubber abrasive wheel.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

Polishing is emphasized; not much metal was removed, as the tip was lightly radiused to more easily slide across the bolt's features. surrogate ejector. The pick tended to catch at the radial transition between each component in the bolt assembly. Clearly, pointy things and gaps between metal bits do not mix. Applying the straight edge of a metal scale over the ejector track, the differences in outside diameter of the bolt components and the gaps between them was even more evident.

I reinstalled the spring-loaded pivoting ejector and bolt, and using a resized empty case, closely watched the interaction of the bolt-face, ejector, and case head as the bolt was hauled to the rear to eject the empty case. In reality, the very tip of the extractor did not appear to be doing any of the heavy lifting when it came to kicking the case out of the action.

The generous .30-30 case rim and head contacted the long pro. The objective was to have a rounded ejector tip ride easily across the various bolt components and their gaps that previously caused the ejector to catch and the bolt to stick. Far This wear track was

also polished with a rubber abrasive wheel. jecting face of the 340's ejector and thus enabled effective ejection.

This confirmed my thoughts that the tip of that ejector, sufficiently sharp as to have been designed by Genghis Khan, could be carefully radiused to allow it to ride over the narrow radial gaps between the components in the bolt assembly. Clamping the ejector in a locking plier, the sharp tip was attempted to be broken with a file, but the tip was almost as hard as the file. A motorized polishing wheel was used to "microgrind" a radius into the ejector tip.

It was a tedious, grind-and-try process, but firearm repair is not for the impatient. Once I found the sweet spot where bolt assembly no longer stopped on the reinstalled ejector, it was time to do a little polishing on the ejector contact path on the bolt.

Polishing the bolt entailed the use of a medium/soft abrasive rubber wheel to remove the majority of ejector wear and residual tooling marks on the bolt, concentrating on smoothing and slightly tapering the transitions between radial components and the bolt body.

The intent was to simply break any edges, or increase the amount of smoothing to those areas so that the radii of the bolt component transitions worked in concert with the slight radius ground into the ejector tip.

While apart, I also polished the wear track on the bolt body made from contact with the sear using the same rationale in the interest of general smoothing of the action. The sear itself was not touched, as the trigger pull was acceptable and the owner was already well accustomed to it. The receiver boltway was also left alone because this was a budget fix for a budget rifle and the customer did not want to invest anymore than necessary.

Once cleaned up, oiled, and reassembled, the 340's bolt manipulation in the shop was directly comparable to that with the ejector originally removed before any work, and .30-30 dummy cartridges as well as empties ejected efficiently. A little judicious polishing and grinding made a nearuseless rifle operational. Again, we're not talking ball-bushing smooth, but the bolt could be withdrawn to the rear and closed again with little effort while grasping the bolt handle. And that's exactly as it should be. AG

HISTORY

Remington 1100 Repair

This 1960s-vintage 28 gauge shotgun had been partially disassembled, the action was locked up, and the feed latch needed to be re-staked. Here is how it was repaired.

BY GLEN CALVERT NOVEMBER 2019

ORIGINAL PP. 9-12

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When I received a Remington 1100 shotgun in for repair, the handguard and barrel had been removed and the action would not cycle manually. I did not get any information on this firearm so its history was unknown. It appears someone had tried to work on it and then gave up. Disassembly If starting with a fully assembled shotgun, make sure the chamber and magazine are empty. Lock the bolt to the rear with the safety on. Remove the handguard nut and handguard and pull the barrel from the receiver.

Remove the barrel seal (rubber O-ring), piston and piston seal (metal parts) from the magazine tube. On this shotgun, the rubber seal was missing and the piston and piston seal were in the gas cylinder on the barrel. While holding the operating handle, push in the carrier release and let the bolt go forward. Remove the operating handle. Push in the The indentations and previously-staked locations are visible. Bottom carrier release and reach inside the receiver to depress the feed latch (right side).

This will allow the action bar and bolt to be pulled out. The bolt sits on the action bar and can fall off if you're not careful. The bolt is a very simple design and can be cleaned without disassembly. Remove the two trigger assembly pins and slide the trigger assembly from the bottom of the receiver. When I did that on this shotgun, the feed latch dropped out. For whatever reason, it had come "unstaked" and needed to be re-staked; otherwise, the trigger assembly could not be reinstalled.

REMINGTON 1100 REPAIR CONTINUED

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Looking into the receiver, I found the reason the action would not cycle. The link that transfers motion from the action bar to the action spring was not installed correctly. The link has two legs that are inserted into the spring follower at the rear of the receiver. The legs must be squeezed together to fit into the follower. In this shotgun, one of the legs was in the follower and the other was not. It was against the rear of the receiver, preventing the action bar from moving rearward.

The link is removed by pulling it forward, lifting it up and turning it 90 degrees to disengage it from the slots in the receiver. The action bar slides in these slots. I sprayed the trigger assembly with solvent and dried it. I did not disassemble it. To remove the stock, remove the buttplate screws and buttplate. Remove the nut from the action spring tube and slide off the stock. There are two washers on the tube and they both legs are in the follower.

The leg outside of the follower is against the rear wall of the receiver and prevents the action from cycling. It may or may not remain in the stock. One of the washers is a lock washer; it goes against the nut. The other washer has two small tangs and fits against the stock. There is a metal plate between the stock and the receiver. It provides a path for the recoil to act on the center section of the stock and not on the outside edges, which prevents cracking.

The action spring probably does not need to be removed but this being an old gun, I wanted to inspect it and clean as needed. To remove the action spring, push in on the plug at the rear of the tube with around tool until the spring pressure is off the pin that retains the plug. Remove the pin and slowly release the plug and spring from the tube. It's best to do this with the receiver in a vise so you have both hands to restrain the spring and plug.

When reinstalling the plug, the slot in the plug must be oriented to the hole in the tube so the pin can be inserted. The spring follower can be slid out of the tube for cleaning. On

this shotgun, the plug, spring, and follower were dirty so I cleaned them and the inside of the tube as well. I cleaned the tube like I would a barrel, using patches with solvent, dry patches, and a light coat of oil. Remove the magazine spring retainer by gently prying it from the tube while restraining it and the spring.

The spring and follower can then be removed. Repair To stake the feed latch into the receiver, I purchased the appropriate tool from Midway USA. It's reasonably priced and works well. I don't know how this repair can be done without it or a similar tool. It comes with a small plate that sits on the outside of the receiver. I added a couple layers of tape on the plate to protect the receiver finish. The tool I purchased did not include any instructions so there was a bit of a learning curve.

It takes some effort to line up properly so that the staking operation occurs at the correct location. I found it was easier to hold the small plate in place on the staking screw by main-

REMINGTON 1100 REPAIR CONTINUED

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taining pressure on the tool against the receiver and then tightening the staking screw slightly when it was in position. The staking operation pushes the softer metal of the receiver against the harder spring steel of the feed latch so correctly. Below, action tube, action spring, follower, plug, and pin. Locating the business end (sharp point) of the tool is important.

The trigger assembly pin must be installed to hold the latch in the correct position and I used a small paper clip-style spring clamp to hold the latch flat against the inside wall of the receiver next to the pin. I also used tape to hold the front of the latch in position while installing the trigger pin. After it is located properly, the staking bolt is turned only

about half of a turn to push the hardened point into the receiver to force the metal into the indentations on the feed latch.

The latch has six indentations, three along each side, stamped into it where it can be staked. The latch was originally staked at four places (the two on each end) and the middle. Clip and pin are removed to stake other two locations.

REMINGTON 1100 REPAIR CONTINUED

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locations were not staked. I staked the two at the rear of the latch first. Staking the two locations on the front requires removing the trigger pin. My advice is put the receiver in a vise, take your time, and double check that the tool is in the proper location before tightening the staking screw. The other screw helps locate the position of the tool against the bottom of the receiver. Reassembly The action follower, action spring, plug, and pin are installed into the tube.

The link is placed into the receiver vertically and then turned so the front tabs fit into the slots in the receiver. The link has a slight arch and the top of the arch goes toward the

top of the receiver. Compress the legs and fit them into the spring follower. Install the trigger assembly and pins. Install the stock plate, stock, washers, and nut on the action tube. Install the buttplate and screws. Install the magazine follower, spring, and retainer. The retainer has a hole in the center.

I inserted along screw- driver into it and the end of the spring to act as a guide. This helps corral the spring.

Place the bolt on the action bar assembly and slide them into the receiver while depressing the feed latch. Install the operating handle into the bolt. Install the gas system parts

onto the magazine tube. The piston seal goes on first, followed by the piston and the barrel seal. The barrel seal, being a rubber O-ring, needs to be rolled onto the tube. I wrapped the threads on the end of the tube with tape to make this easier. There is a sticker on the action bar that shows the correct position of the parts.

Retract the bolt and insert the barrel into the receiver. Install the handguard and nut onto the magazine tube. Check for proper operation using snap caps. This old shotgun is now ready for many more years of shooting clays and hunting. AG

PEOPLE & COMPANIES

.223 Versus 5.56

While these cartridges seem to be the same, there is a difference and it matters.

BY PATRICK SWEENEY NOVEMBER 2019

ORIGINAL PP. 13-18

Gunsmith's should have the SAAMI-published list of unsafe caliber combinations detailing cartridge and chamber combinations that can be force-fit into a rifle and the combos that ought not be there. One surprising (to some) inclusion is the .223 Remington and the 5.56x45. While they are not the same and should not be used interchangeably, .223 is generally safe in the 5.56 but the reverse is not. How do they differ?

Given dozens of chamber dimensional drawings used by reamer makers, custom gunsmiths, and arsenals across America, we can't cover every named variant. First, the two are the same in headspace dimensions. Consulting chamber dimensions reveals some combinations might suggest that one or the other won't work, but the overlap of bolt face to shoulder dimensions is so great that it doesn't matter. At least, not for this discussion.

The datum line and plus-or-minus of what is permitted for the shoulder location is not the problem here. They are also the same in listed chamber pressure but that takes a bit of explaining. Where they differ is in the leade, known as the throat, and how they are loaded. The .223 Remington was unveiled in 1962 but went into production a year or two later. Originally the .222 Special as an R&D cartridge for potential military adoption, it became the .223 Remington and was used in the then-new Armalite AR-15 rifle.

When Defense Secretary Mc Namara forced the adoption of the Armalite, requiring the dropping of the M14, the Army resisted. Top, we have the SAAMI .223 Remington chamber and leade with its short jump. Center is the common 5.56 leade with proper jump for a hot load. Bottom is the 5.56 M-Guns NEMRT (North East Multi-Regional Training) clean up reamer designed by Ned Christiansen of M-Guns meant to clean up any problems or disparities in dimension from the earlier chambering. Oh, they seemed on-board at first.

But then they started moving the goalposts. Literally. The original "We'll be fine with helmet perforation at 200 yards" became 300, then 400, then 500 yards. To get that performance, the cartridge performance had to be throttled up. Armalite and Colt could not re-design the rifle to accept a larger cartridge as that would have killed the project. (Probably what the Army wanted, really.) So, they did what magnum developer Roy Weatherby had done for his cartridges by extending the leade.

This allowed for a greater powder charge while controlling pressure to deliver the velocity they needed to meet the Army demands for downrange performance. OK, a step back to internal ballistics. When the powder charge on a rifle is ignited, the powder burns from the base forward.

Unlike a handgun cartridge, where the entire powder charge can be consumed before the bullet even begins moving, and in many instances before the bullet has left the case, in a rifle cartridge the initial burning of the powder will push the unburnt powder in the column forward, and the bullet will jump free of the case. (This all happens in fractions of milliseconds.) That is why some cartridges will require a stout neck tension, or heavy crimp, in order to ensure proper combustion of the ladders of slow-burning powders used in them.

The bullet, having moved forward, in effect creates a larger case for the powder to burn in. A larger-capacity case with any given powder charge in it means it generates less pressure. However, when the bullet strikes the leading edge of the lands, it slows down. It has to, because it takes time and energy to engrave the bullet. The slowing bullet, while the powder is still burning, creates another pressure peak.

This is simply part of the gas laws, an aspect of thermodynamics that hit the newspapers during the NFL's Deflategate episode. The slowdown, the stalling of the bullet in the engraving, is to a large extent the cause of the peak of the pressure curve. Without that slowdown, the peak would not be as great. (The only way to prevent that

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Original caption: opposite: the powder charge and type is selected on the assumption there will be along leade and shallow onset to mitigate some of the extra powder (or slower-burning powder) used to gain the 5.56 performance. That charge, or burn rate, is what gives the 5.56 its 2-300 fps velocity gain over the .223. But it comes with the requirement of a 5.56 leade. What is the intermediate result of shooting 5.56 ammo in .223 chambers?

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slowdown is to eliminate rifling. That is a benefit not worth the cost.) So, what Armalite and Colt did was to move the engagement surfaces of the lands forward. They also made the angle of onset, the “ramp” of the rifling the bullet has to hit, more shallow on the 5.56. All of this reduces bullet stall and reduces the pressure spike that the stall creates. In essence, they found a “free” way to get more velocity from the same case and rifle.

As a tactical/engineering decision, they also relaxed the allowed diameter of the throat, the unrifled portion of the chamber, that being the space between the end of the case and the beginning of the rifling. This allows for more gunk, smut, debris, fouling, etc. to accumulate before reliability issues arise in a combat environment. Not always, and probably not often.

Other things break bolts, but the pressure spike of 5.56 in .223 leades causes other problems. 56—and it was marked by the barrel maker—for the company that built the rifle. Too bad it actually was a .223 leade. Oh, and an important detail to keep in mind: there is no SAAMI spec for 5.56 ammunition. Only military. And there is no military spec for .223 ammunition, only 5.56. So while we are not exactly comparing apples and oranges, we are getting perilously close.

So, what happens when we mix up the cartridges in our pressure barrels or firearms? Let’s assume for the moment that we’re dealing with .223 Remington and 5.56x45, each loaded to 55,000 PSI. Fired in their own chambers, they will post a maximum average chamber pressure of 55,000 PSI. Ho-hum. If we swap them, it gets... interesting. The .223 in the 5.56 chamber, because of the longer leade, will have a measured chamber pressure lower. Sometimes a lot lower. It can be as low as 46-47,000 PSI. The reverse?

That’s the bad news. The 5.56 fired in a .223 chamber can have truly impressive pressure spikes. If we start at 55,000 PSI in a 5.56 chamber, that same ammo in a .223 chamber can be 20%, 25%, or even 30% greater. I have had such ammo and chamber combinations pressure-tested that went from the low 50s in pressure when tested in 5.56 barrels, to upper 60s when tested in .223 barrels.

I have talked to ballisticians who have recorded pressure barrel readings with some 5.56 loads in the mid 70s when fired in .223 chambers. That is over the proof load. How can it be that they have the same pressures when loaded in their respective chambers but marked differences when mixed? The leade and the powder type and charge used in a .223 is done with the assumption that the bullet will be experiencing a short throat with a sharp-angled rifling onset.

THE 5.56 IS THE

The first thought people have is “Bolts must break.” This seems to not be the case as broken bolts we have seen in law enforcement patrol rifle classes don’t follow the pattern of “5.56 in .223 chambers” use. Usually, bolts break (when there is a pattern) when end-users have short-barrel rifles and put suppressors on them. That rifles do not come apart with the wrong ammo combination in this instance tells me that the designers and engineers who make them have done their jobs properly.

But that still leaves us, and our customers, with a problem. What happens when you fire a steady diet of 5.56 ammo through a rifle chambered in .223? And how can you tell which it is? Because a lot of the time the markings on barrels are wrong. I have found this out from years of working as an armorer and instructor in LE patrol rifle classes. Back in “the day” we saw a lot of “frankenguns”—home-built rifles and carbines.

In the last decade the numbers of those has dropped off markedly and almost all we see today are factory-built rifles. But the problem of .223 chambers persists. First, how it manifests itself, second, why there is a problem and why we can’t necessarily believe what we read, and third, how to solve the problem.

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This is an expensive way to deal with the problem as the couple of thousand rounds (minimum) of ammo costs more than the barrel, or the reamer and gauge. 56 chamber (the case mouth will rest right under the “A” of NATO) has plenty of room and a gentle angle for the bullet to engrave the rifling. The problem with the over-pressure situation of 5.56 in a .223 chamber is not just in extra stress on the rifle. There is also the case to consider. The pressure is great enough to loosen primer pockets in a single firing.

In our LE classes, when it comes time to police the brass, it isn’t unusual (if we take the time to inspect cases) to find empty cases from factory ammunition lacking primers. This is obviously bad for the reloaders among us and our customer base. But also, you have to ask; where do those primers go? Most of the time, overboard and onto the ground, along with the case. But not always.

Before we started checking all rifles for .223 leades, we would have a rifle—or two or three—typically stop working a day or two into a class. The three and five day classes have varied over the years, but a 3-day class can count on 500 rounds and a 5-day class can now easily reach 1,000 rounds. Before ammo got expensive, and budgets limited, we were easily doing twice that and then some. The other armorer and I would find spent, expelled primers in the most amazing locales in the malfunctioning ARs in use.

The loose primers would rattle around in the lower receiver until they tied up the trigger, and once there would have kept a rifle from firing. They would bounce around in the upper, where they would often have to be fished out of the locking lug recesses of the barrel extension. The bolt can’t rotate closed when there is a primer in there.

They’ve been found in the carrier (the cam pin slots is equally unwilling to work with a primer in it) and once we even had to use a dental pick to pry the primer anvil out of the carrier gas key where it had separated from the primer cup and become lodged. All of these were discovered because the rifle stopped working. This would be very bad if the first shot lost a primer and the second shot was unavailable due to the primer being someplace it ought not to be. The most alarming one was also the most puzzling.

In a particular patrol rifle class, the line of officers had just finished a drill, and in the pause, after the drill-end whistle, there came a sudden “b-r-r-r-p!” Followed immediately by a “Patrick! Ned!” We were being summoned for a problem. As we walked up, the lead instructor told us and everyone there, “I was looking directly at him, his finger was not on the trigger.” (Always good to have solid, dependable info on a problem.) What had happened?

At the end of the drill, the officer involved had followed the steps properly: scanned the targets, lowered his muzzle, and was

applying the selector to Safe. It resisted, so he forced it, and that was when his semi-autoonly, factory-built carbine kicked off a three-shot burst. We gingerly took the carbine out of his hands, cleared the chamber, and then proceeded to perform a post-mortem on the carbine. We checked all of the usual suspects and found nothing.

We then slowly and carefully disassembled it, inspecting every part as it came out. The last to come out, the trigger, revealed a primer anvil, flattened, on the bottom deck of the lower interior. A-ha. We gauged the chamber. Yes, it had the expected .223 leade. We took care of that problem, scrubbed it up, and he ran the rest of the class without a problem. He had been using 5.56 ammunition. One round had the primer fall out of the loosened primer pocket and it fell into the lower.

There it got bashed up until the anvil came out and that bit of brass alloy had finally found its way underneath the trigger, causing the excitement. As far as we could tell, the anvil had restricted trigger movement when the safety was pushing on it, and the dimensional “float” of trigger, hammer and disconnect had allowed it to run away for three shots until the anvil was flattened enough to create clearance. With clearance, the sear could contact the hammer hook, and it stopped firing.

So, most of the time, the “popped” primer isn’t much of a safety problem. When it is, the usual result is that the rifle stops working. But

.223 VERSUS 5.56 CONTINUED**ORIGINAL PAGE 16****ARCHIVE IMAGE WITHHELD**

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56 NEMRT reamer sets the leade just enough past 5.56 to clean up any errant problems that the chamber might have had. 223 leade with the dial calipers set to the distance of a 5.56 NEMRT leade. You can see the difference and the source of the problem. once, this time, it caused a misfire. Luckily (actually, due to good training) the officer involved had the muzzle pointed in a safe direction and was paying attention to what was going on. It ended up as a useful bit of knowledge, a great story, and no harm done.

Why is this a problem? That pressure spike. The stalled bullet with the powder charge meant for a 5.56 chamber causes excess pressure, expanding the case, and primers fall out. They even fall out of cases with crimped primer pockets. The excess pressure may not cause parts malfunctions but it can cause operational malfunctions. We cannot depend on the barrel markings to guide us. When we realized the 223 leade and not wedge in place in a 5.56 leade.

You can use ink, a Sharpie, or Dykem to mark the gauge and see where it is binding, if it binds. If it isn't, then there's no problem

here. extent of the problem, we began gauging the leade on every rifle in the classes. In the first class we did this, four rifles failed the gauge having .223-sized leades, even though three of the four were marked "5.56". The fourth was unmarked. All four ended up having classic "popped" primer malfunctions in the next day of the class.

Once corrected, they did not cause problems for the remainder of the class. Why would a rifle marked "5.56" not have a 5.56 leade? Because, with rare exceptions, rifle makers do not make the barrels they use. They buy barrels from barrel makers. If the rifle maker does not gauge every barrel on arrival and insist on only accepting 5.56-leade barrels, they will invariably end up with .223-leade barrels. Why? My assumption is that this is due to accuracy.

It has become an attitude among AR-15 owners and buyers that it is their birthright to buy an off-the-shelf AR that shoots 1 MOA at most, or better yet, sub-MOA. Anything less accurate is a cheat. (We will leave unmentioned-on the probable inability of most of them to actually shoot sub-MOA.) Any rifle

that fails to shoot accurately will be blamed on the maker and returned. To cut down on the rate of returns, rifle makers will accept .223-leade barrels and a marginal increase in accuracy.

The vast majority of shooters will not put enough ammo through their AR to experience a popped primer. And even those who do shoot a lot, they will not often be feeding it a steady diet of 5.56-loaded ammo, and thus not experience popped primers. There, any popped primers that are observed will be blamed on the ammo, the heat, the lack of cleaning, etc. The shooters can be counted on, however, to note every group that fails the 1-MOA test and complain loudly if there are too many of them.

There is also the matter of wear. Each round fired erodes the throat just a bit. Without extensive testing it can't be pinned down, but after a few thousand rounds, the spike has to be less extreme than when the rifle was brand new. So, if a shooter gets through a few thousand rounds without experiencing a problem, they may not know they ever had one. Erosion gauges are coarse instruments

.223 VERSUS 5.56 CONTINUED

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for this kind of measurement. Unlike the old Garand gauges, with a measurement from zero to ten, the M16 gauge simply has a Pass/Fail line. In that regard, the worst rifle I ever gauged was an A2 frankengun. The officer who owned it had been using it as his patrol rifle for a couple of decades and we were having trouble establishing a starting zero on the first range session of the class. Finally, having exhausted everything else, I poked an erosion gauge into the chamber.

I thought it was going to fall out the muzzle, going a good eight inches down the bore past the Fail line. Despite this, he had passed the qualification course just prior to arriving at the class. So, while wear decreases the problem, there's no way of telling what is what with an erosion gauge. There are some companies you can depend on. The exemplar here is Colt.

Say what you will about their customer service, parts supply, sales effort, etc., we have never gauged a Colt AR-15 or M16/M4 that showed anything but a 5.56 leade. So, how can the problem be measured, and then corrected? Ned That lets me know when it might be time to get it sharpened.

Christiansen of Michiguns LTD. (MGuns.com, 269/273-GUNS) makes a special gauge and a reamer called the NEMRT (North East Multi-Regional Training) clean up reamer to correct the problem, so named as it is used by that law enforcement training team. The gauge is made to

the maximum dimensions of a proper 5.56 leade. If you insert this gauge into a clean chamber, and it does not bind, stick or otherwise wedge in place, you have a 5.56 leade. If it does stick, then you have something less.

I have taken to using a Sharpie or Dykem and coating the gauge in black, then stuff it into the chamber. If there is binding, I can see where the ink has been rubbed off. This keeps me from getting a false negative when gauging, for example, a barrel that happens to have a .223 Wylde chamber. A .223 Wylde chamber might have a tight-enough neck with a 5.56-length leade that the gauge will show some resistance when used. Marking avoids the false reading. The reamer is a special design.

It is made like a chambering reamer but the shoulder has been ground to be a non-cutting, bearing-only surface, and a safe edge. The throat and leade are dimensioned to clean up any .223 leade, and produce a 5.56 leade instead. It is actually a bit over the "book" specs of the 5.56 in throat length (but not diameter) just to clean up any vestiges of .223 leade that might be there.

The non-cutting shoulder means you can rotate the cutter all you want; once it has cut the leade, it won't cut more and you do not risk increasing headspace. And that is the problem when taking the shortcut of using a 5.56 chambering reamer to correct a .223 leade. There's also the matter of bore material.

Ned has the reamers fabricated out a special alloy, and they have been given additional heat treatment so they will cut carbon, stainless steel, and through chrome plating. "Wait, I want chrome plating, I don't want to cut it off." You have a choice: a .223 leade with chrome or a 5.56 without.

And to make the choice for you or your customer easier, the first place the chrome of your .223 leade will be burnt off is exactly where you'll be cutting it, so you soon won't have chrome there anyway, at least after a few practice sessions. So, an easy choice, really. What the reamer won't cut (and will be dulled by) are barrels treated via Melonite. These are easy to spot once you've looked over enough ARs and most of them are 5.56 leade anyway.

A barrel given the Melonite treatment that has a .223 leade is a hopeless case and can only be dealt with one of two ways: feed it only .223 ammo or send it back to the maker with a nastygram. When I ream a chamber, I used a spring-loaded marker to stamp a single indent into the handle body of my reamer. If I use it on a chromed barrel I do a pair of dots, side-by-side. That lets me track use of the reamer and decide if it is time for are-sharpening.

The reamer comes in a handle that is also a storage holder, along with a correct-sized Allen wrench to disassemble from storage, assemble, and then return the reamer.

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The M-Guns reamer has a “safe” shoulder and cannot increase headspace no matter how much you turn it. You need both to diagnose and then fix a leade problem. How much of a difference does this make? Ned once received a late-night phone call from a regional LE ammunition rep. His company had just delivered several literal truckloads of bonded, LE-purposed ammunition to a law enforcement agency. The agency was having no end of problems with their fleet of new rifles and the LE-specified ammunition.

If the rep couldn’t solve the problem, the agency was going to ship back the ammo and expect a full refund. And yes, their first thought was the ammo, not the rifles. Ned explained all the .223 vs. 5.56 leade details to the ammo rep. Yes, ammo companies don’t always have all the details on rifles and LE agencies are almost clueless when it comes to technical details. (Are you surprised?) He overnighted a gauge and reamer to the rep.

The rep went to the agency, and asked for the test rifle that had experienced the most problems. He then gave them the short version of all this info, gauged it, and it failed the gauge.

He reamed the leade and then had the agency rangemaster do full-auto mag dumps until they were all satisfied that the problem was solved. (We can only imagine the phone call to the rifle maker that followed.) So, if you have a malfunctioning

AR, one that coughs up primers and parts of primers when you clean it, this could be the problem. Gauge, ream, and life is good.

As I recall, the ammunition rep took the reamer with him, and gave them Ned’s name and contact info for future use. .223 Wylde So, then what is the Wylde chamber? In an effort to gain the pressure control of the 5.56 but not give up the accuracy edge of the .223, Bill Wylde essentially took the leade length angle and throat length of the 5.56 and combined it with the throat diameter of the .223.

That is a short, sketchy and incomplete description of the work it took and the final dimensions he settled on, but it will have to do for now. This offers the best of both worlds and a lot of rifle makers have adopted. It is also the reason I use the Sharpie to see what the gauge is telling me. If I find the gauge has the ink rubbed off of the throat area but is not touching the rifling, the chamber has a .223 Wylde throat and does not need to be reamed.

If it is still popping primers with a .223 Wylde chamber and leade, then there are other problems that requires a different solution than chamber reaming. That said, the accuracy difference between .223, 5.56, and Wylde is probably too small for most shooters to notice. Yes, an NRA High Power shooter might be able to tell you how many X-ring hits he gave up with a 5.56 vs. a .223 Wylde leade, but then again, maybe not.

I have used rifles, carbines, and SBRs with 5.56 leades and reamed leades to easily drop 300 meter “Ivans” on a National Guard range and its computer-controlled targets. I’ve tested before-and-after rifles using magnified optics and have not seen a significant change in accuracy. For me, the pressure control is worth any potential (and as yet unseen) loss of accuracy. That said, I am not an NRA High Power Master-class shooter and don’t know how many Xs I might have given up. SAAMI vs.

CIP “But CIP lists a higher pressure for 5.56 than SAAMI does.” Yes, and CIP measures pressure in a different location on the case as well. You cannot just look at the numbers as it is like comparing apples and oranges. The only way to know what a certain CIP-approved load does for sure is to test it in both CIP and SAAMI test barrels. When I find someone who has both of them, and they are certified and current, I’ll do that and report on the results. The SAAMI vs. CIP comparison is not unlike the old CUP vs.

PSI conversions. What the ballisticians found was that there was no universal “CUP times Xfactor equals PSI” formula they could use. Each caliber was a law unto itself and all the data had to be re-generated. So, if someone tells you that the CIP pressure for a given caliber is higher, lower, or the same as a SAAMI pressure, the polite reply to that would be, “Thanks.” AG

HISTORY

Ruger 10/22 Accuracy Upgrade

The Ruger 10/22 rifle has a large variety of aftermarket parts available to improve its performance. This is what I did to improve the accuracy for rimfire competition.

BY GLEN CALVERT NOVEMBER 2019

ORIGINAL PP. 19-21

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The Ruger 10/22 is one of the most popular .22 LR rifles in history. Introduced in 1964, more than five million have been produced. It was the first firearm that I purchased, along time ago. It is reliable, durable, and reasonably accurate. Like the AR-15, there are tons of aftermarket suppliers that provide replacement parts to improve the 10/22 performance.

In the spring of 2019, I joined a small group of gentlemen who meet weekly in a friendly competition of shooting .22 LR rifles at 50 or 100 yards on NRA Smallbore targets. I

showed up at the first shoot with my Ruger 10/22 topped with a 3-9X scope of about the same vintage. Even with match grade ammo, it was only capable of 1.2" to 1.9" groups at 50 yards.

After seeing the other competitor's rifles and their results, typically less than 1 MOA, I quickly realized these were accomplished shooters with matching equipment. Realizing that I would not be competitive with my rifle, I looked for a means of improved accuracy and considered buying anew rifle. One of the guys also had a 10/22 that he had built using

Kidd components. His rifle was very accurate so I decided to look into modifying my old 10/22.

Rifle Modification My 10/22 is about 30 years old and has been mainly used for plinking. The only modification was a trigger spring kit installed many years ago that lowered the trigger pull from about 8 lbs. to 4.5 lbs. Until I was using it in competitions, my 10/22 sat in the safe for along time while I shot more recently-purchased centerfire rifles.

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Original caption: Top: 600 grit sandpaper wrapped on brass punch used to increase the receiver bore diameter. from the receiver. The barrel slipped out of the receiver easily. Measuring revealed its tenon diameter varied from 0.682" to 0.684". Before installing anew barrel, any old paint in the receiver bore must be removed. My receiver had some paint in it which I removed by wrapping 600 grit sandpaper around a 0.62" diameter brass punch until it would just slide into the receiver bore when slowly turned by hand.

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Tony Kidd (KiddInnovativeDesign.com) offers about every component needed to build a 10/22, including barrels, receivers, bolt groups, trigger assemblies, etc. His match barrels are guaranteed to deliver 0.5" groups at 50 yards (1 MOA) and my fellow competitor was getting 1 MOA or better at 100 yards with his. From the reviews I have read, the Kidd parts are top quality, and in my opinion, are reasonably priced.

I decided to replace the barrel on my 10/22 and ordered the Kidd .22LR Match Stainless Steel Rifle Bull Barrel 20" Polished. Kidd offers a variety of barrel lengths, profiles, material, fluting, and finishes. I received my barrel in only a few days in a heavy cardboard box with plenty of packing material. The barrel was in a clear plastic tube with endcaps and

the barrel had two O-rings on it that kept it from touching the tube. I don't think I have ever received anything so well packaged.

According to their website, the Kidd barrels are bored and rifled by Lothar Walther in Germany and the bores are hand lapped. The barrel has a 1:16 twist and a 11-degree crown. The barrel was very nicely done in all regards. I checked the bore with my Lyman scope and it was very smooth with no tooling marks. I removed the action from the stock and then removed the barrel, trigger assembly, and bolt group Stock has raised comb and flat bottom to rest on rear bag.

The new barrel tenon diameter measured a uniform 0.685" which was the same diameter as the receiver bore. Kidd refers to his barrels

as slip fit. My new barrel was a "line to line" fit (maybe because the receiver was an older version) and it would not start into the receiver. I don't like using a hammer to assemble a firearm so I slowly removed material from the receiver bore with sandpaper and frequently checked my progress. I clamped the barrel in a padded vise to make this easier.

I wrapped the sandpaper tightly on the punch and made the diameter just slightly smaller than the bore. This helped keep it aligned and the bore round and straight. The barrel tenon had a very small radius on the end as opposed

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22 LR ammo tested. 25" group with RWS Special Match ammo. to a chamfer. Since the receiver material is soft, the end of the barrel tenon galled the bore surface and caused the barrel to bind in the receiver. I applied anti-seize compound to prevent this. When I found spots where the receiver wouldn't slide onto the barrel, I wiped the anti-seize out of the bore and used sandpaper to remove additional material.

I kept slowly removing material until the receiver slipped all the way onto the barrel using hand pressure. I used my scope mounting bubble levels to align the barrel slot and the bottom of the receiver. The fit of the barrel to the receiver was solid so I installed the V-Block and screws. Tony Kidd recommends torquing the screws to only 10 inchpounds. It is not possible to get a torque wrench on the

screws since they are so close to the barrel, so I tightened the screws with an Allen wrench and called it done.

I could have put the barrel in the freezer and the receiver in the oven to help the assembly but this would have resulted in an interference fit and I wanted to be able to remove the barrel in the future without potentially damaging the receiver. The bull barrel would not fit in the Ruger stock and I did not want to modify it, so I purchased a laminate stock from Boyds. The stock has a raised comb to allow a good cheek weld and a flat surface to ride on a rear bag.

The receiver fit snugly into the stock and the barrel does not touch the stock at any point along its length. I replaced the old scope with anew Athlon 4-12X40. At the Range I shot the rebarreled 10/22 with the same Federal Gold Medal HV Match ammo that I had used with the original barrel. The new barrel shot

much smaller groups from the get go. Knowing that some brands of ammo are more accurate than others in any given rifle, I asked the other competitors what ammo they preferred.

I obtained boxes of the various brands and tested them in one session at the range. It was a calm, 75 degree day so I can't blame the wind for the spread in group sizes. The results are shown in the accuracy table. The Federal HV Match and the RWS Special Match ammo had the smallest groups and the smallest averages. The RWS was the most consistent. It was also twice as expensive as the Fed HV ammo, roughly \$10 per 50 round box compared to \$5. My modified 10/22 has proven to be very competitive in the matches.

When asked if it's from a custom shop, I'm happy to say that I built it myself. AG

MAINTENANCE & REPAIR

The Business of Gunsmithing

Every professional gunsmith had to answer the, “How do I get started?” question. Here is a summary of my practical strategic compendium for gunsmiths that want to go professional.

BY MARK R. HOLLESEN NOVEMBER 2019

ORIGINAL PP. 22

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As a gunsmith, we are often tested on our knowledge of a certain repair, our knowledge of firearms, reloading, target shooting, etc. Included in those knowledge tests, I am certain you have been confronted with the question of, “How do you become a gunsmith?” More importantly, how does the person asking you become one? As you all well know, this is not an easily answered question if you plan on giving the answer that best covers the process. Why you ask?

Well, as we know on this side of the gunsmithing fence, this job is very diverse and complex and explaining it to that person in any level of detail can lead you to wander somewhat with your reply or explanation. More often than not, we use our own road taken or journey as the platform for our response. What I often find the most challenging in that conversation is trying to cover what I think the person asking would need to know.

And that is most difficult when you really know nothing about the person you are talking with. What are their skill sets, what have they done already (if anything) to start their path towards becoming a gunsmith, and what stage are they in their life that will help them with their career choice? In reality, you really need more information from that requestor so that you

can formulate a logical response. I’m certain that you don’t get this question asked of you often, or maybe at all.

But when you do, you pretty much have to pull your thoughts together quickly to cover at least some of the process. I recently had this question asked of me by the father of a young lad that seems to want to become a ‘smith one day. He is currently fourteen and is trying to get smart on all things guns.

So where do you begin with answering the dad that knows nothing about guns, has no idea where to begin, where to go, what to do, what he should be doing right now; essentially, what can he do to help his son get on the right path. And this is only one scenario that you may be confronted with.

There are others, like the person that tinkers with guns and wants to formalize his work and become a gunsmith, or the person that can’t stand his or her nine-to-five job and wants to work with his or her hands and gun work excites them. So you see, the simple question is not so easily answered. Until now. About a year ago, I began working on a manuscript that describes the process in greater detail. Why you ask?

I did some research and I personally could not find a source that covered the topic, at least all in one place. The more I researched

and thought about my own path, I realized that there are many complexities related to taking this type of career path. And the greatest complexity that I found is determining exactly where the person thinking of taking on a career in gunsmithing is, in their particular life, and at that very moment.

In order to convey a proper or suggested path forward, you really need to understand what that person has done so far in their life that would help them get on the path towards becoming a gunsmith. It was at that point that I felt that a well-thought out response was in order. I took on the challenge of walking through the process from the thought or idea of taking on a career as a gunsmith, to what you should be doing, not be doing, and more importantly, what you can expect when traveling down that road.

Let me say here that there are so many roads that can be taken that I was unable to cram them all into one book or guide. And coupled by circumstances that each individual person contemplating this type of career path could have, there was without a doubt that I would not be able to cover every single individual situation. Therefore, I began by covering my particular path, including successes, setbacks, and real life situa-

MAINTENANCE & REPAIR

Reader Forum

BY AMERICAN GUNSMITH EDITORS NOVEMBER 2019

ORIGINAL PP. 23-24

Winchester .22 Speedloader I thoroughly enjoy your magazine as there is always useful information for repair and upkeep of my own firearms and those of friends. Especially enjoyable was Ed Nutter's "Winchester .22 Speedloader" (June 2019). Following his instructions, I found aluminum tubing of the proper size at the hardware store to hold .22 LR cartridges. While this works, I've found thin-walled aluminum arrows area great option. I got mine from a friend who was through with them.

I used a tube cutter to cut them to the desired length. Capping the ends was easy. Screw Protectors (SP) for 5/16-inch screws (yellow) fit tightly and stay put once installed. Green SPs for 3/8-inch screws fit tightly enough to hold .22 ammo until ready for loading, using an index finger to control the flow. source that to me, would have been very beneficial when I began my journey into gunsmithing.

The book covers topics such as evaluating yourself and your current situation, what tools do you bring to the table (abilities and capabilities, not screwdrivers), where you are with you life when you decide to undertake this career choice, what your best next steps are or should be, getting an education, moving on into the world as a beginner, what to look out for and what not to do, building or creating your personal "gunsmith persona", performing self inventories, how to work in a shop for someone else, customer service, customer

relationships and support, starting your own business, and building a well-thought out knowledge resource library.

These are the highlights you will find in my book, all logically placed in order. The book is not very long as I kept only the important items that should be included and weeded out things that are less important or should be less important to you as you begin your chosen career path as a gunsmith. Not only will the book allow This setup works for tubular magazines and .22 revolvers; just orient the ammunition according to the firearm.

The primer end comes out first for tubular magazines, and bullets out first for revolvers. Mr. Nutter is right. Leaving ammo in the tube over time causes the discovery of new life forms. Ed Nutter responds. Spurring innovation; thanks for the information! Remington 32 Shotgun I'm a collector of Remington 32 shoguns and have two with bad trigger springs.

I'm particularly interested in learning more about the entire trigger mechanism. you to quickly point a prospective gunsmith in the right direction as far as how to get started on their newly chosen career path, but it also gives the beginning gunsmith a more concise and focused path forward that should assist in reducing wasted time and efforts wandering aimlessly while trying to figure out what to do and where to go next. As I always say, I certainly do not know it all.

What I do know is what I have personally learned and have now put to print for you to consider while on your chosen career path to become a gunsmith. Those of you that are already in business and making a good profit may not see the benefit of this book, but it could be a time saver source for you to point a beginning or an up-and-coming gunsmith to as a starting point and to get them smart on what is sure to come their way if they continue towards their career choice to become a gunsmith.

I know for me, I now have a product that I can reference from this day forward when asked the question, "How do I become a gunsmith?" or "How do I open my own gunsmithing business?" AG From Sergey Lyalko.

The November 2004 issue has my article "A Second Life for the Remington 32" highlighting a dedicated conversion of a Remington 32 into a "Krieghoff 32." I'd write it a bit differently today but the point remains that design problems of the 32 cannot be perfectly cured by repairs and are better taken care off by migrating to Krieghoff parts in the Remington 32 receiver. This is exactly what German gunsmiths did.

John Davidson Running The 1911 RK Campbell did a great job with "More on Running the 1911" (September 2019) on adding info to the 1911 treasure trove for gunsmiths. Relative to recoil springs, I have two suggestions for 'smiths who do a lot of 1911 work. First, I created a table that lists spring wire diameter, the number of turns, and weight. When- Mark Wyatt

READER FORUM CONTINUED

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ever I buy a spring, that data gets recorded for a reference chart. Second, there is also a very useful spring measurement tool specific to 1911 recoil springs made by SDM Fabricating (SDMfabricating.com). I use this tool for springs that do not fit into the chart's database with good results. Bill Jenkins 10XcustomGuns.com From author RK Campbell. This is very useful! Thanks for sharing. Working S&W .22 Pistols I'd like to thank Brian Smith for his September 2019 article on S&W rimfire pistols.

I'm not a professional gunsmith but I like to be able to repair my own firearms. I bought two Model 422s about 25 years ago and use them for practice several times a year. I didn't know about the existence of EWK Arms (EWKarms.com) and that info was worth the price of the subscription. Do you know if it is possible to disable the magazine safety? I have never liked that feature or found it to be necessary. Author Brian R. Smith responds.

I appreciate the kind words and am pleased that my article was of interest and assistance with your 422 pistols. Regarding disabling the magazine safety, it is theoretically possible but due to the crafty design it is not as simple as removing a particular component. The magazine safety "lever" that is depressed by the presence of a magazine in the grip frame would need to be mechanically held in place in the depressed position, presumably by drilling and pinning.

Beyond that, I don't have any specific howto instructions because I've never considered disabling the safeties on 422-series pistols. This is one of those "anything is possible given enough time and money" things. While I completely concur that the magazine safety is annoying, I put up with it myself for liability reasons. Kimber Solo Carry A relative of mine won a Kimber Solo Carry at an NRA fundraiser dinner, so they only have the price of a raffle ticket in it.

The problem is the gun won't consistently feed and it stovepipes regularly. Changing magazines did not correct the feeding problem. John F. Lewis Do you have any information on these kinds of issues and fixes for this pistol? Some of the local shops in my area (midwest Illinois) don't want to touch this model. Steven Kern From RK Campbell. Kimber has a very specific list of ammunition for this pistol and recommend only using that exclusively.

The Solo is designed to function optimally using premium hollow-point self-defense factory ammunition with bullet weights of 124 or 147 grains. Examples include Federal Hydra-Shok, JHP, Remington Golden Saber HPJ, and Hornady TAP JHP. While other ammunition may perform well, lighter bullets and inconsistent pressures that can be found in lower-quality ammunition may lead to decreased slide cycle time and compromise function. In short, this pistol seems picky, even finicky, and even Kimber acknowledges that.

From Ray Ordorica. It's worth noting that Kimber has discontinued the Solo. Would suggest the owner consider using something like a Kel-Tec PF9 instead. Marlin 27S Magazine I'm looking for a parts/assembly diagram and a complete magazine tube for a Marlin 27S chambered in .25-20. Any recommendations? Frederick Ludwikowski From Paul Mazan and Mark Hollensen. The only source for Marlin 27S parts we can locate is Gun Parts Corp (GunPartsCorp.com).

They have a parts diagram and list both inner and outer magazine tubes in .25-20. We recall these having a stud fitting into a dovetail under the barrel and a screw that holds the tube to that stud with a hole in the outer mag tub for accessing the screw to the stud. Based on the parts layout, it appears that after removing that screw the mag tube just pulls out of the receiver. AG

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