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ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 173

DIGITAL ARCHIVE EDITION

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MACHINING

HM Defense HMB Bolt

BY AMERICAN GUNSMITH EDITORS MAY 2018

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The AR-15 is America's longest serving service rifle and has a deserved reputation for performance and reliability. However, as with any machine, parts can fail. While not a particular weak point (10,000 round counts area reasonable minimum) AR-15 bolts can break. One potential point of failure is the center hole fitting the cam pin. HM Defense designs, develops, and produces AR rifles and parts that feature a number of their own patentpending technologies.

The company manufactures and final machines rifle components in-house in their Mt. Orab, Ohio facility. To improve bolt longevity, HM Defense designed their HMB Bolt, an enhanced durability part for M16/AR-15 and AR-10 rifles. The HMB Bolt corrects a natural weak point in existing bolts where the cam pin hole passes through. Under extensive use, standard bolts can fail there. The HMB Bolt eliminates the passthrough cam pin hole and replaces it with a socket and tapered pin.

This reinforces a natural weak point by significantly increasing the amount of metal and strength at the cam pin location. HMB Bolts are drop-in replacements and made of 9310 steel with a 4340 hardened steel cam pin and Nitride black finish. Additionally, the HMB Bolt reduces contact between cam pin and firing pin, enabling smoother operation of firing pin, bolt lugs and aft gas rings. The new cam pin socket also retains lubrication for extended operations.

The AR-15 model works with 5.56 NATO, .223 Remington, and .300 AAC rifles. This bolt comes standard on all HM Defense HM15 rifles and is available as a bolt replacement kit or in a complete bolt carrier group. "The HMB Bolt design provides a substantial improvement in longterm durability over the existing Mil-Spec bolt," said Clay Barker, General Manager at HM Defense. "Every M16 and AR rifle can benefit from our new HMB Bolt design." For more information, contact HM Defense (HMDefense.com).

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PEOPLE & COMPANIES

Ruger Revolver Tuning

Ruger's single-action revolvers have a deserved reputation for reliability but benefit from gunsmith attention. Here's how to tune them up.

BY ROBERT K. CAMPBELL MAY 2018

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Among the most reliable and rugged revolvers out of the box are single-action Ruger revolvers. These include the Single Six, Blackhawk, and Vaquero models. These revolvers have an earned reputation for good accuracy and handling. However, when it comes to a crisp and clean trigger action, these revolvers leave something to be desired as compared to the majority of factory revolver trigger actions.

As an example, I recently worked with a special edition Ruger Blackhawk that was nicely finished but lacking in smoothness. The single action trigger, the main complaint, demanded 5.5 pounds trigger compression. This limited the accuracy potential of the revolver. The owner is a good shot but felt limited by the heavy trigger action. Trigger compression of 3.5 to 4.0 pounds is ideal for a Blackhawk revolver and will aid in controlling the trigger.

A smoother action also aids in reliability as there is less eccentric wear and the parts move smoothly together. It is a viable move to carefully polish the trigger action to produce less friction. Caution is indicated

when dealing with the trigger action. It is possible to ruin parts if you are not careful. As always, less is more when removing metal and working toward a smooth polish. The equipment needed should be in stock at your shop. This includes the everhandy Arkansas stone as well as large and small files.

Action Work Before attempting trigger action work, I have a set procedure. I begin by testing the trigger action on each revolver. If it is heavy—and the illustrated stainless steel revolver was—it may be time for an action job. Sometimes using Shooter's Choice FP-10 to lubricate the action and then holding the hammer back manually while pressing the trigger removes a burr and smooths the action. It is worth trying. A simple cleaning often is an aid in cleaning up a trigger action as well.

To go further, disassemble the revolver. The Ruger Blackhawk is a simple action and we have been manufacturing such revolvers in America since 1836. It normally isn't necessary to do more than remove the grip panels for most work, however, if we ad-

dress the hammer and trigger we must go further. With the revolver disassembled take a look at the hammer strut where it sets in the hammer. The end that sets in the hammer will often need polishing. Do not remove too much metal.

Give it a light polish and examine the work under magnification. This doesn't typically lighten the trigger action but it will make for a smooth cocking action. Next, examine the sides of the strut where the mainspring moves upward and downward. Any burrs will cause the spring to bind. This is less common with late model production but is sometimes seen. Check the seat for uneven lips and burrs. The hammer strut rides in the back of the hammer.

It isn't easy to get to these parts and you'll need something hard and stable to work this area. It isn't possible to do the job without a proper, stabilized tool. A drill bit is often best. Less is more and this area may be lightly polished. The hand (or pawl) moves the cylinder. As the cylinder is rotated,

RUGER REVOLVER TUNING CONTINUED

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The weight is determined by the coils, not the length of the spring. Some of the cocking force is used in this rotation and some in cocking the hammer. This is where a mistake can ruin the timing of the revolver. The area the hand plunger rides on may be polished. A simple cleaning and lubrication can help. An area of concern for Cowboy Action shooters may be the loading gate. Bending the gate spring downward makes for a lighter action but you don't want the loading gate to open under recoil.

Be careful and leave this alone if there are no complaints here. Note, Brownells offers an extra power base pin latch. For a Ruger Blackhawk intended for heavy loads or for long use, this is a good part to upgrade. Custom grade springs are then fitted. An overlooked part of the Ruger action is the trigger return spring. Any burrs and roughness of this part and the trigger can be seen under magnification.

Simply cleaning up the trigger and trigger return spring can reward the careful worker perhaps eight ounces less trigger action com-

pression weight. When looking over the sear, the sear engagement in the hammer might be polished. However, this is one area in which the engagement must be maintained. We do not wish to make a slip hammer! A poor or mangled engagement would result in the hammer falling before the trigger is fully pressed.

An experienced writer told of a cowboy that asked him to check the trigger action of his Colt. The writer did not know the trigger action had been modified by someone with ten thumbs. He cocked the old Colt, holding it down by his side, and began to bring the revolver to the target in the classic shooting style. The revolver fired too soon and blew out the square toe of his cowboy boots, fortunately without further mishap. Do not destroy the original angles here and file lightly, if at all.

The cylinder latch is pushed by the hammer plunger. A small punch is all that is needed to remove this part. Almost all of these will have a sharp edge near the front that should be broken up. Working in the sear area de-

mands an abundance of caution. Never change any angle; simply make the surface smoother. With a stainless steel revolver the result of our best work with grit paper results in a mirror finish.

This is the area in which the aforementioned revolver was unsafe, as the sear had been modified to the point the hammer would actually jar off engagement and fire. Safety rather than time is the primary concern. Another concern is left over flakes from the casting process. No matter how good Ruger revolvers are, they are cast, not forged, and there may be small amounts of metal left over in the channel the transfer bar rides in. Work this metal out by polishing.

Polishing cloth on the end of a needle file works in this area. Springs So far I have given an overview of the things that may be done to make a Ruger Blackhawk single-action revolver smoother. These next more

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specific procedures center on the hammer spring or mainspring and the trigger return spring. The lighter hammer spring isn't going to help the trigger action. A hammer that is lighter to cock is good for some folks but it also means the hammer falls more slowly. It is just part of the tune up. You may polish sear engagement. The hammer and trigger interface may be polished but the angle should never be changed.

What we are doing when we reduce engagement isn't always to make for a lighter action—although the action will be lighter—but we are making for a shorter, cleaner break with less take up. Addressing the trigger return

spring, Ruger designed the Blackhawk to be more durable than the Single Action Army and it is. It was also designed to be easier to work with. You need only remove the grips to get to the trigger return spring and mainspring.

Drive out a single pin (the trigger return spring retaining pin) and release the “legs” from the grip frame. I routinely perform such work on handguns intended for competition or hunting. Those intended for defense and loaded with hard-recoiling .357, .44 Alexandria VA 22310

RUGER REVOLVER TUNING CONTINUED

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or .45 ammunition are not given such a light trigger action. The focus there is on breaking Magnum primers. The means by which I have modified the trigger break is to bend the trigger return spring. One bend shortens engagement and the other reduces the pounds needed to work the spring. The trigger return spring is looped. One side rides on the trigger, pushing the trigger down and resetting the trigger as the hammer is cocked.

The other end of the trigger return spring is loaded up as the hammer is cocked, giving the spring its power and energy for reset.

Bend the looped end so that it doesn't ride its body on the trigger and only the end of the spring is in contact. When properly done, this reduces contact and shortens take up. Creep in the trigger action is lessened or eliminated.

The actual pull weight is addressed by bending the other end of the spring upwards at this end where the spring connects to and is stabilized on the frame. Be certain to not have the spring lop sides and that each spring side is bent equally. A very small movement results in considerable lightening so take this

one easy and carefully gauge the results by putting the spring back in the gun to test each adjustment. Tuning these pistols isn't difficult.

In addition to these techniques, another option is to order a reduced power trigger spring and mainspring. These parts are high quality and have given excellent results. I still modify the trigger return spring as the end result is worth the effort. AG the spring.

RIFLES

Gas Tube Alignment, Revisited

The never-ending saga continues. Here's an update on gas tube alignment for AR-15 builds.

BY JOE CARLOS MAY 2018

ORIGINAL PP. 7-11

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When I published the predecessor to this article way back in March 2014, the title did not contain “Part One” because at the time I thought I had thoroughly covered the topic and put things to rest. Since then, the rules for one of the biggest and most popular matches on the planet (CMP Service Rifle Nationals at Camp Perry) have changed. My original article covered Service Rifle AR-15s as they had to look like a stock M16A2 as seen in any military arms room around the country.

This included A2 look-alike handguards. Hidden underneath, however, you were permitted to install a float tube to remove sling tension from the barrel. Companies offering these units normally marketed them as a set, including the float tube, modified A2 handguards, and a gas tube with custom bends designed to keep it from contacting the handguard at any point.

While the actual float tube may have been made in-house, the modified A2 handguards and custom gas tubes were almost

universally outsourced to other specialty houses. This outsourcing resulted in mismatches. Hard contact between the float tube and gas tube threw gas tube alignment out of whack, resulting in fat groups and lots of fliers. My original article dealt with ways to fix this problem, mostly by re-bending the gas tube. It might be helpful to review that article.

Among the more recent rule changes, handguards no longer Middle, handguards removed from a Compass Lake Engineering unit showing the actual float tube underneath. This allows the barrel to float and all sling pressures to be removed from the barrel. The CLE unit comes with a properly-bent gas tube that requires no gunsmith workarounds. Bottom, an example of a quad rail handguard that in some configurations are now legal for Service Rifle shooting in NRA and CMP matches.

Some of these railed handguards come with very fat replacement barrel nuts that force gas tubes way out of alignment. have a M16A2 look-a-like mandate. Both the NRA

and the CMP are alike in concerning what now constitutes legal handguards, though there is some difference and a unit that might be acceptable in an NRA match may be disallowed by the CMP. The CMP even changed their wording regarding handguards from one year to the next.

Handguards that were perfectly legal in 2016 were in some cases disallowed in 2017, causing a lot of ire among competitors. Granted, the change was published in the newer rulebook but who would think to even look when the handguard on their rifle passed muster the year prior? These rule changes seemed to be capricious and not grounded in any safety or real-world function issues.

As a shooter or custom gun builder, you now have to consult two different rulebooks before selecting a handguard and read them every year to make sure that changes in word-

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The revisited approach more often resorts to removal of metal to correct problems. Far ing or requirements don't catch you flat footed. And you darn sure better have a fat check book as these different handguards can go all the way to about \$400. Pardon me if I seem critical. Both the NRA and the CMP do a wonderful job of running their respective matches and neither outfit gets enough credit for their efforts.

But having two different rulebooks, two different load plans, two different starting positions for rapid fire events, and now two different configurations of what is legal equipment is perplexing and reminds me of how lucky I was in meeting my competitive goals while things were uniform and operated under the KISS Principle. I try to take an optimistic outlook on some of these differences because they can force us to hone different skills that may prove valuable in the real world.

But these differences... Climbing off my soap box and getting back on topic: Even if you area gunsmith who seldom is called upon to work on Service Rifle uppers for National Match Course competitions, the handguards that are so popular in that discipline are also used on Match Rifles, Palma guns, F-Class, 3

Gun, certain metal impact target sports, and tactical builds. In fact, ARs for some of these disciplines have been sporting these handguards before the NMC crowd. What's The Big Deal?

Before we discuss how to diagnose and fix gas tube alignment issues in these new handguards, it is important to understand why gas tube alignment is so important to achieving tight groups. It all relates to precisely aligning the bullet to the center axis of the bore. Errors in achieving this stellar alignment result in bullets entering the bore at an angle and deforming. Thousandths of an inch area big deal in this bullet alignment business.

Actors that have a vote in getting bullets properly aligned are chamber dimensions ("AR-15 Chamber Selection" in the July-September 2014 issues), how square the receiver face is in relation to the barrel extension (watch for an article on this soon), cartridge considerations ("Better Ammunition", April 2016), and bolt carrier matters ("AR-15 Upper Quick Fixes: Match Bolt Carriers", May 2014 and "Combating AR-15 Bolt Carrier Tilt", May 2017).

Improper gas tube alignment causes the bolt carrier assembly to cock at an angle when the carrier key goes over the back of the gas tube

up inside the receiver. The bolt face needs to be perpendicular to the center axis of the bore in order to center bullets and this can't happen if gas tubes are positioned at an angle. Test target results prove this.

Diagnostics And Assembly When I am in the process of building an AR, regardless of the discipline, I always use the following procedure and it might be helpful if you adopt the same steps. I insert the barrel extension into the upper receiver. Take the front sight assembly or gas block with gas tube attached and begin sliding everything down the barrel while watching the back of the gas tube as it draws closer to the cloverleaf-shaped hole in the upper receiver.

The tube should enter this hole straight on and without any assistance. If it fails to do so, perform whatever judicious bending that is required to get it to comply. I suggest referring to my previous article on this for tips on doing it right. This needs to be as perfect as possible. With this done, pull the gas tube off and install whatever serves as a barrel nut as provided by the handguard manufacturer. There are numerous styles and this part is where trouble often boils just under the

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The bolt carrier will be tilted at an angle, causing rounds in the chamber to be out of alignment with the bore and resulting in deformed bullets. Bottom, a properly-aligned gas tube and bolt carrier will result in smaller groups and fewer fliers. surface. You may have a nut that allows a torque wrench to be attached. The average sweet spot torque for 20" heavy Service Rifle barrels that area full inch under the handguard is 47 foot-pounds. Skinny A2 contour barrels take 60 ft-lbs.

Neither setting is likely to be optimal for your particular rifle but they are good starting points if you plan to tune barrel harmonics for best groups. See "AR- 15 Barrel Harmonics" (October 2016) for tips on how to perform harmonic tuning. Done right, harmonic tuning is usually good for about an average 20% reduction in group size but it does require actual range firing of groups and is fairly time consuming.

Once what serves as a barrel nut is in place, slide the gas block with gas tube attached back down the barrel, making sure that nothing is interfering with it going effortlessly through the clover leaf. If there are issues, correct them. Here I perform several tests. Although there is flexibility in the order, don't skip any of them. Hold the rifle up to the light and make sure there is a distinct line of white between the top of the barrel and the bottom of the gas tube, just as Stoner originally designed.

Pay particular attention to the barrel nut. Some of these are manufactured too thick and can jack the gas tube up at an angle. With the gas block and tube pulled off, look

through the back of the receiver at the cloverleaf hole and make sure there are no visible obstructions on any of the four corners. Some of these barrel nuts are so oversized they look like humpback whales sticking up in the bottom of the cloverleaf. Failure to properly correct that will guarantee fat groups and lots of fliers!

If there are any teeth or holes in the barrel nut through which the gas tube must pass, don't forget this last test: Run any straight gas tube with bends similar to the one designated for your rifle into the cloverleaf from the front. Keep the gas hole pointed down. Continue to push the tube further into the receiver until the back of the tube is about even with the back of the receiver.

This technique allows seeing misalignments that wouldn't be as apparent when the gas tube is in normal position with only an inch or so showing up inside the front of the receiver in the channel cut out for the charging handle. If the gas tube points towards the ejection port side, the torque is too heavy and needs to be reset by a foot-pound or two lighter Re-torque and inspect again. On the other hand, if the gas tube points toward the bolt catch side, the torque is too light.

Reset for heavier torque and try again. There is one correct setting on issue barrel nuts and a lousy foot-pound on either side of that setting will have the gas tube pointing left or right of center. I like to hit the gap between the teeth where the gas tube passes a lick with a Dremel tool and widen it out just a little so I have insurance against misalignment.

Corrective Measures Concerning minor left to right errors in alignment caused by improper torque settings, looking through the back of the receiver at the cloverleaf you'll notice either George or Gracie (the humpback whales in Star Trek IV: The Voyage Home) sticking up and obscuring free insertion of the gas tube. The only viable recourse is removing serious metal! Don't try fixing this by re-bending of the gas tube as we did in the previous article.

Instead, start by running the gas tube through the cloverleaf and then marking each side of it with a white Sharpie on the top surface of the offending barrel nut. This leaves a set of railroad tracks about 1/4" apart and shows where metal needs to be removed. Spin the barrel nut free of the receiver and go to work. If you area professional gunsmith with a fully-stocked shop, you don't need me to tell you how to proceed.

Some of these barrel nuts have three sections with the front section closest to the muzzle being thinner than the two really thick rear sections. You want a channel through the thick sections that is not less than 1/4" wide but don't cut through the bottom! The bottom thickness should be about 0.083" which mimics the thickness of a regular barrel nut as Stoner originally designed. You may ask if this isn't causing the replacement barrel nut to be weak.

I work on ARs every day and have never encountered a barrel nut failure. There was absolutely no safety reason for handguard manufacturers to make their replacement

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nuts so thick! I suggesting chucking these overly-thick replacement nuts in a lathe and turn the circumference down to the 0.083" dimensions of a stock barrel nut. The handguard portion slips over the barrel nut snug as it comes from the factory and is then clamped in place by various screws and fixtures.

Turning down the whole circumference of the replacement barrel nut will make it impossible to mount the handguard section and you will end up groveling to the manufacturer for anew one because you screwed up their screwed-up nut that they provided with the handguard kit. This is a stack up of screw ups rivaling the height a plate of pancakes at Denny's! Cutting a channel or filing a flat on just the top of the barrel nut will not degrade the further mounting of the actual handguard section one iota.

It will be covered by the handguard section and completely invisible. If you area hobbyist, your options will be more limited. Most will grab a big file and start working on a flat. This works but is time consuming because there's a lot of metal to remove. Some of these replacement custom nuts I have measured as large as 0.176" thick, 0.094" thicker than the original, so that's nearly a 1/10 of an inch. See you in an hour or so! Careful use of a Dremel or a grinder can shorten the pain of this task significantly.

Neatness doesn't count; function does here. If you don't want to invest the time and considerable effort doing it yourself, take the thing to a machine shop along with copious notes from this article and paythem to do it for you. It sucks to have to pay someone to fix the manufacturer's screw up after

already paying \$400 for the original purchase but there is a cost of doing business and often a greater cost for trying to look cool on the range with a fancy handguard that has rails on every possible side.

Adding additional insult to injury, in spite of paying big bucks for all those rails, jacking up the final cost by a bunch, a lot of match rules prohibit attaching anything to them! I find rails on the sides, and especially on the bottom, to be uncomfortable on my support hand even with a heavy leather shooting glove. Perhaps I need to start taking a testosterone supplement? Regardless of what exact method of metal removal you employ, inspect to make sure you have removed enough.

If you end up with a flat, hold everything up to the light and make sure you can see daylight between the top of the finished flat and the bottom of the gas tube. If you end up with a channel, it will be harder to make a visual determination. Tear apiece of paper about 3" long and 1/2" wide and slide it in the channel under the gas tube, running it back and forth the length of the cut. If you have any hang ups or snags, remove a little more metal. If the paper moves freely, the machining was adequate.

Lest you think that all the fun has ended, you are probably wrong. Due to manufacturing tolerances in the barrel extensions from one lot to another, the next time you rebarrel the upper it is very likely that your flat or milled channel won't time up right at 12 o'clock and you will have to start all over again. These replacement barrel nuts are like the gift that keeps on giving but in a very aggravating way!

Far Actual metal removal, such as the aggressive flats filed on the top of the one pictured here, will be required to fix the problem. This is a JP Enterprises handguard that is done right and doesn't require any gunsmith workarounds. Why In The First Place? At this point you are likely asking yourselves why the manufacturers of some of these railed handguards created them with these over-sized replacement barrel nuts, thus making life difficult for gun owners and gunsmiths.

I see evidence that some sound reasoning was involved. Because of the way that the body of the handguard attaches to the barrel nut, the outside diameter of the nut becomes the inside diameter of the handguard. So a fatter barrel nut results in a fatter cavity inside the handguard and greater clearance from the barrel that is housed inside of it. I rather imagine this was an overriding consideration in the design of these units. In order to shrink the O.

D. of the barrel nut, the inside cavity of the actual handguard would also shrink, providing less clearance to the barrel that lives inside of it. Unfortunately, many makers of custom handguards only manufacture this one part and don't build full custom guns. They are applying tunnel vision and remain oblivious to the impacts to other parts of the gun they have inadvertently created.

Alternatives There are other very good alternative handguards on the market which result in floated barrels and require zero workarounds. The Compass Lake Engineering 1 1/4" float tube comes with the tube, modified A2 (G. I. looka-like) outer handguards, and a prop-

GAS TUBE ALIGNMENT, REVISITED CONTINUED

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erly-bent gas tube that won't require any adjustments. The whole set up costs about 1/3 that of the overpriced quad rail units. If that is too much of an old school look for you or some of your customers, I can recommend the JP Enterprises Modular Hand Guard System. These are available in a variety of lengths for building everything from tactical carbines to Match Rifle, Service Rifle, and Palma ARs. It is round and, like the CLE unit, very comfortable to the support hand even without a heavy shooting glove.

If you are building a gun for CMP and/or NRA Service Rifle matches, thoroughly research the current rules to ensure that it is legal. I often write directly to CMP and attach a picture if there is a question on a particular handguard or other part. Many shooters were burned in 2017 and I want acknowledgment in writing that I can provide my customer to include with their range kit.

If you or your customers are simply in love with rails (they are the current flavor of the week, after all) JP Modular units are drilled and tapped on all four sides and the company has rail section accessories in various lengths. The CMP 2017 rules were so draconian that even the percentage of the handguards that are covered with rails was dictated. What possible sense this all makes still baffles me and many shooters. If attaching accessory rails, be careful of the screw lengths and positioning.

I've seen the gas tube extending up close to the inside of the handguard in certain areas and you don't want screws extending down and contacting the gas tube. Both JP and CLE build whole ARs for competition as used by some of the biggest names in competitive shooting, so both companies understand the entire gun. I prefer to buy parts from them because they don't result in unintended consequences elsewhere in the gun.

Real World Examples I was lucky, or maybe I just followed good shop assembly and inspection procedures that only take

minutes to perform. I identified and corrected found problems in the first of these quad rails to make its way to my shop.

Others were not so lucky and I soon started hearing from them either by personal visits to me at Camp Perry (Commercial Row Building 910-A during the CMP Service Rifle Nationals in late July) or by email inquiry. The folks that I heard from were individuals who had other types of handguards on their rifles initially and knew the accuracy potential of their guns. They had taken those original handguards off and substituted the stylish quad rail units, only to have their groups go to hell in a handbasket.

I was glad to share the information in this article with them on how to restore their accuracy. About half of them opted to perform the work themselves and the others just handed me their upper or shipped it to me to perform the corrections. I tried to keep in touch with these folks as much as possible and every one of them that I was able to get feedback from said that after the accuracy-robbing gas tube alignment problems were corrected their original accuracy came right back!

What worries me are the guys who are doing brand new builds using these quad rails. I guarantee you their accuracy is being degraded and most of them have no clue as to the culprit. As is nearly universally the case, I predict they are blaming the barrel maker because they nearly always get the blame. Or they are blaming the gunsmith that did the work. Unfortunately, many gunsmiths are unaware of these problems and are misplacing their trust in the handguard manufacturers to do it right.

That's what motivated me to write this article. Part 3? I dearly hope I won't need to submit a Part 3 on gas tube alignment in a couple of years. It does seem to me, however, that just as fast as I come up with cures to such a problem, good ol' American ingenuity invents new ways to throw monkey wrenches into the mix. On

top of that, it seems new companies are springing up very rapidly, with each trying to outdo the others in the business in trying to score points on "cool" designs with less emphasis on accuracy.

I guess I should look at all of this as job security. As long as companies insist on screwing up their designs, I will have plenty to write about. There are numerous handguards out there I don't yet have experience with. I am sure there are issues with some of them but I hope that if you encounter these my articles will help diagnose and correct any gas tube problems you may encounter.

I mentioned earlier that shooters discovered on their own by shooting normally off the shoulder that their groups had gotten fatter and that fliers had increased when they substituted new railed handguards in place of older methods of floating the barrel. After the gas tube alignment issues were corrected they saw their accuracy performance restored. I have also verified this using a machine rest.

Some of those folks, meaning well, have reached out to those handguard manufacturers in an attempt to call their attention to design flaws. As a professional gunsmith I have done this as well. It is a real tightrope to walk. Nobody likes getting an "F" on their homework! I am still of the opinion that Penn State gave me a degree mostly just to get me off campus and make room for smarter students, so I understand. Unfortunately, some of these manufacturers responded with condescending attitudes.

I suppose this depends on which tech person you talk to on a given day, the way you present your case, and what kind of day the person is having. Between the attitude at some of the factories and the difficulty of a total redesign of the whole unit I mentioned previously, I strongly suspect that we professional gunsmiths are going to have our work cut out for us for quite awhile. AG

FINISHING

Fun With Flintlocks

Inexpensive flintlocks are great project guns to learn how to work on a host of gunsmithing tasks. Here's how to hone your skills with one of the oldest firearm types.

BY PAUL MAZAN MAY 2018

ORIGINAL PP. 12-15

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Original caption: Top: Ultra Hi Tower-style flintlock. The bulky appearance is typical of the Tower-style large caliber coach pistols. This inexpensive sample is a perfect test bed for learning or honing gunsmithing skills. The first step is the totally disassembly of the pistol.

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The novice gunsmith is faced with learning many skills that can only be perfected through practice. Be it stock repair, refinishing, bedding a stock, adding a forearm tip, checkering, adding a recoil pad or an inlay, they are all woodworking skills that must be mastered. Then there is metal work, including polishing, rust removal, filing out pits, and refinishing, not to mention the mechanics of trigger work and repair of broken parts or the fitting of new ones.

For anyone that wants to work on guns and do a good job—whether it be on just his own and a few friends guns or in a commercial shop—the beginner has a lot to learn. Probably the worst way to learn is to work on a perfectly good gun and mess it up. Next in line for worst is to only practice on a flat piece of wood or a piece of metal that, when finished, inspires no real confidence.

Beyond early, initial practice, I have always been an advocate of learning on an inexpensive gun where the monetary loss of poor workmanship is negligible. For

example, I have a Stevens 311 side-by-side shotgun that has been the test bed of so many first-time jobs there is literally nothing else I can think of to do to it. It was the first gun I ever installed a recoil pad on—and the second and the third—until I was satisfied with the job I did.

It was also the first gun I refinished, installed lighter springs, modified to hang far enough open to insert shells without having to hold it open, slim the receiver, checker the stock and forend, cut long forcing cones in, and make

Notice this was likely sold as a kit. The brass is as cast and no pins have been installed to hold the ramrod pipe or trigger guard in to the stock. into a straight English-style grip and a splinter forend. That is eight jobs I learned to do on that one gun. The key is to haunt gun shops and gun shows looking for broken or abused guns that you can buy

FUN WITH FLINTLOCKS CONTINUED

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The grip area shows a rather odd bump in front of the butt cap. Simple file and sandpaper work will reshape the stock along more traditional lines. cheaply. Many gun shops have guns they have taken in on trade that are in no condition to resell and aren't worth repairing. Usually all you have to do is ask. You can often pick up single-shot .22s or shotguns for very reasonable prices.

As an example, I recently picked up two pieces that I could work on to improve my abilities at inlaying and inletting, a skill I am not satisfied with. Both were muzzle-loading pistols and the total outlay for the two pieces was under \$100. The first pistol was what was sold back in the 70s as a Tower-style reproduction. It is a .69 caliber smoothbore flintlock made in Japan and marked "Ultra Hi" and was a blocky, unadorned beast of a club.

The butt cap was loose and badly fitted, there was some rust from just hanging over someone's fireplace, and it didn't look to have ever been fired as the face of the frizzen didn't have a mark on it. To me it was the perfect project to totally disassemble and render into something any self-respecting pirate would be proud to own (assuming there ever was a "self-respecting pirate.") The first job was to totally disassemble the gun. After laying the parts aside I decided to tackle the woodwork first.

I reshaped what looked to me as a clumsy grip section into a more traditional style. That consisted of simple file and sandpaper work. Looking to the lockplate, I wanted to make anew one in the same style I use on all my muzzleloaders. Using the brass lockplate supplied as a pattern, I cut and filed a piece of walnut to glue into the inletting on the stock to fill it. Later, I drew the lockplate I wanted on paper and glued it to a piece of sheet brass to use as a guide to cut out the new piece.

To finish up the woodwork, I stripped the finish, purchased a nose cap, fitted it to the front of the stock, and sculpted the wood behind it to give the pistol a sleeker, more custom look. From there it was a matter of inletting the new lockplate, sanding and finishing the wood, and refitting the butt cap. The touch hole was a simple hole drilled through the sidewall of the barrel, so I fitted anew touch hole liner to make ignition nearly instantaneous.

Using Birchwood Casey Plum Brown Barrel Finish, I browned the barrel, the lock, and the steel ramrod. The only forend cap I could find to fit the 1 1/16-wide octagon barrel was steel. To make it match the lockplate, butt cap, and trigger guard I used a Texas Platers Supply 2453 W. Five Mile Parkway, Dallas, TX 75233) Brass Plating Kit to give the forend cap a brass-plated finish.

This work resulted in a betterlooking pistol, however, anything with a .69 caliber barrel that is 1 1/16" across the flats is going to be a beast and I am looking forward to taking it out to the range. I discovered that two .36 caliber lead balls fit snugly sideways in the bore and I'm thinking a 35 or 40 grain charge of FFg under four .36 balls should make a very impressive boarding pistol load.

With the first project out of the way, I took the Traditions "Pirate Pistol" kit I had acquired and thought I'd really challenge myself and see if I could convert it to a left-handed model. I happened to have a left-handed flintlock I had picked up just waiting for a project for it to be used on and this seemed the perfect opportunity. Keep in mind that what we are doing here are exercises to improve skill and ingenuity when faced with an unusual situation.

It may not be very likely to ever have a friend or customer that wants you to convert a right-handed muzzleloader to a left-hand gun but the skills developed here will be useful in other work you may do. In this case the major job was to fill in the inletting for the lock on the right side of the stock and then inlet the left-handed lock into the left side of the pistol.

I have found poplar to be an excellent choice of wood when trying to match almost any birch or walnut stock because it is easy to work and will take stain to as near the same

FUN WITH FLINTLOCKS CONTINUED

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The original brass lockplate was used as a pattern to create a wooden insert to fill the inletting cut and allow changing to a custom-made lockplate. Wooden insert is glued into old inletting and sanded flush with the surface. color as the other woods such that it is almost impossible to see any seems if it is closely fitted. I took a piece of plain white paper (stole it right out of my paper copier), laid it over the lock inletting, and made an outline of the opening using the side of a pencil.

Then, the outline is cut out and glued to a piece of sheet brass to use as a cutting guide. Then it was plated to match the brass

furniture. Scallops were cut on each side of the ramrod channel to reduce some of the bulky look at the front end. I then cut the resulting outline out and glued it to the wood as a guide for the insert I was making. It was a simple matter of cutting the poplar to the outline on the paper and gluing the insert in place.

Inletting the lock and all of its related components into the left side of the stock is a more challenging proposition. The first step is to completely disassemble the lock. It is necessary to make sure the lock will line up with the screws that pass through the stock to hold it securely in place. By disassembling

completely, you can use the screws as guides by pushing them through the stock. Screwing them into the back of the lock will positively locate it so the holes will align after it is inletted.

To disassemble the lock, hold the mainspring in compression to remove it. The best tool for this is a Track Of The Wolf Mainspring Vise (Brownells 870-000-001AQ or TrackOfTheWolf.com). There are other ways to compress such main-

FUN WITH FLINTLOCKS CONTINUED

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Original caption: Top: The lockplate has been inletted, the stock stained, and the butt cap reinstalled. springs using pliers or vise grips but the vise is the safest way. Also, consider the prospect of finding a replacement flat V-spring of exactly the dimensions that you broke using the wrong tool is too horrible to contemplate. This Traditions "Pirate Pistol" came as a kit. By filling the inletting for the lock on the right side and inletting a lefthanded lock, this was converted to a left-handed flintlock.

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With the lock located on the stock and held in place by the screws passing through the stock, trace around the lock with a pencil. Then, either inscribe a line around the lock with it in place, or remove it and inscribe a line using a thin-bladed knife. Remove the wood inside the outline. Continue deepening the inletting until the pan contacts the barrel and fits flush against it. Now you can locate the flash hole just below the top of the pan. Drill and tap the flash hole and install a flash hole liner.

In this case there was already a flash hole on the right side of the barrel so I drilled and tapped that hole and installed a screw to the same depth as the thickness of the side of the barrel and cut it off to block the old flash hole. With this done, add one part at a time to the lock and inlet that part until the lock contacts the barrel once again. Continue adding parts to the lock one at a time and inletting them.

To aid you in removing wood in the correct places, use a candle to smoke (deposit soot on) the part and press the lock in place. The soot will leave a black impression where it

touches the wood and you then remove the blackened wood, repeating as necessary. If you're not comfortable having a burning candle on your bench, Jerrow's Inletting Black (Brownells 457-001-050AQ) can be applied to the part with a brush. Continue this process until the lock is entirely assembled and will function correctly.

Either of these projects will go along way toward teaching you some of the skills necessary for the gunsmith—either hobbyist or professional—to master before attempting to customize a customer's prized and/or expensive gun. AG

PEOPLE & COMPANIES

Precision Scope Mounting The Remington XP-100

Conventional scope mounting often fails to bring out best accuracy in a firearm. Here's how a quality scope mounting system on the legendary, half-century old Remington XP-100 pistol changed all that.

BY NORMAN E. JOHNSON MAY 2018

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In the past I have worked with several Remington Model XP-100 handguns, including a totally rebuilt model of switch-barrel status with four barrels and two bolts. The Model XP-100 is a very durable, singleshot action capable of extraordinary accuracy. Performance, of course, is directly dependent on the optical sighting system, as well as loads used and shooter technique.

The subject of this treatise involves a standard issue Remington Model XP-100 chambered for the .221 Remington Fireball car-

tridge first introduced in 1963. It is a shortened version of the popular .222 Remington and continues to be produced as a factory cartridge today. The XP-100 turned over to me wore a 1.3x15 Bushnell pistol scope with integral 3/8" dovetail receiver mount attached by the two front 6-48 receiver ring screws. Not exactly a setup for delivering top-notch accuracy as received.

The projected plan was to mount a 2.5-10x32 Sightron scope with a one-inch tube using a one-piece Talley Manufacturing 221

Remington Fireball with Talley Picatinny scope base, ready for fitting. Note single screw hole at top rear of receiver calling for a second screw hole. 278" forward of the existing 6-48 hole. Utmost care must be taken in locating, drilling and tapping this hole.

Talley Manufacturing. com) Picatinny Base for Remington 7, 600 (Product Number: P00252720) and 1" Tactical Ring (Black Armor) (Low) (Product Number:

PRECISION SCOPE MOUNTING THE REMINGTON XP-100 CONTINUED

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This scope base compliments this space-age looking gun. BAT10L) scope rings. In tests that I have conducted I could readily demonstrate that a well-made Picatinny scope base along with well-aligned scope rings actually adds rigidity to the gun receiver while maintaining true coaxial alignment at optical center. Mounting The Scope Base The 5 3/8" Picatinny scope base spans from a point a half-inch forward of the front receiver ring to the rear of the receiver.

There were two 6-48 base screws at the front and but one 6-48 screw hole at the rear of the receiver. This base has two screw holes at the rear, spaced 0.273" apart. Measurements indicated there was ample room for a second screw hole. Here I drilled and tapped the sec-

ond 6-48 hole. The procedure must be performed with utmost care and precision, and was done in the milling vise. Talley had furnished the second screw, which was very suggestive for adding it, as I did.

All went well with this phase of the work and the scope was mounted. Manipulation of the scope rings permitted optimal eye relief, which is important with a handgun delivering even moderate recoil. A safe eye relief must always be considered. Rear Action Screw Access There exists a feature about the action mounting in the stock on the Remington Model XP-100 that isn't too well designed... at least, in my view, it isn't.

The slotted fillister rear action screw with 82 degree head is countersunk 2.75" inward from the rear tang into the floor of the bolt channel. The screw threads into an Below and escutcheon cast into the stock. The screw passes through the slotted trigger link used to connect the finger loop of the trigger to the trigger mechanism on the underside of the stock. Both receiver guard screws pass through this slotted trigger link. There must have been some loss of sleep in this design.

Removal of this rear slotted screw in lifting the action from the stock is quite impossible without first removing the entire scope mounting system. In the process I found a way to remove the action from the stock with the scope base solidly in place.

PRECISION SCOPE MOUNTING THE REMINGTON XP-100 CONTINUED

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The screw replaces the fillister head screw. Far It can be done with the scope still attached to its base or with scope removed from its base. This is performed via a screw-head-sized hole drilled through the Picatinny base and was accomplished by drilling a 3/8" hole through the base 0.850" from the rear of the base. The hole is located directly above the rear action screw for easy screw removal.

I also found it necessary to substitute the 82-degree slotted fillister screw with an 82-degree socket Considerable thinking had taken place here during development. 3x15

Bushnell with 3/8" dovetail mount attached to the front receiver ring. On bottom, the replacement scope is a 2 1/2-10x32 Sightron scope with Talley one-inch Tactical scope rings. head screw of same length.

The screw can then be removed with an Allen wrench from directly above, through the hole drilled at base center, or by reaching into the side of the cartridge loading port using quarter turns with the same wrench. I often take the action out of the stock to thoroughly clean the firearm or make other adjustments. If the option to conveniently remove the

scope and reattach it to the Picatinny rail is used, the gun will still remain sighted as the scope rings are locked back on the rail in the rail slots.

Final Testing In the accuracy testing process of any gun, nothing is written in stone. Each gun can be quite different from another. Sometimes the end result can be hard to predict. In the load and accuracy development of various scoped pistols, I had designed and built a special pistol rest. Properly used, it pretty much eliminates any human error

PRECISION SCOPE MOUNTING THE REMINGTON XP-100 CONTINUED

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221 Remington Fireball shows a well-balanced gun weighing 4 pounds, 14 ounces with the 2 1/2-10 Sightron scope equipped with Talley Tactical scope rings on a Picatinny base. The old gun dates back more than a half century. A good pistol rest is an absolute must in delivering best pistol accuracy in load development. in testing. As shown in the pictures, the fully adjustable rest supports the underside of the pistol butt and/or barrel or forend.

The upward and rearward recoil allows the gun to settle back into the Load development is the final proof of a gunsmith's efforts. 349" average for three five-shot groups from a 10-inch barrel would better the performance of many good rifles. A quality optic mounted properly makes this handgun shine. two sand bags shot-to-shot. In testing the XP- 100 .221 Fireball, I used a variety of loads with very encouraging outcome.

In one series of three five-shot groups at 50 yards using 52 grain Berger bullets, the groups me a su red 0.415", 0.362" and 0.272"

for a 0.349" three-group average. I have tested some pretty expensive rifles that wouldn't do this well. In my own experience, the changes I have shown here have made this already fine, old gun easier to work with in delivering superb accuracy and performance. Revisiting the venerable old gun and cartridge has been a pleasure.

Sometimes as gunsmiths, just another close look at our work can be very fulfilling and this was one of those times. AG

RIFLES

Precision Case Neck Turning In A Lathe

The importance the cartridge case plays in shooting cannot be over emphasized as it involves both accuracy and safety. Neck turning cases in a lathe creates zero run out in a fraction of the time compared to using conventional, hand-operated, neck turning tools.

BY NORMAN E. JOHNSON MAY 2018

ORIGINAL PP. 20-22

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Allow me to hark back to my own, long-term experience dealing with cartridge cases. My earlier work in this area was published in the 1966 Gun Digest as “Case Neck Variations... And Their Effect On Accuracy.” Here I emphasized the importance the cartridge case plays in different types of shooting, ranging from common hunting rifles to bench rest matches.

I had detailed in the text how a “case neck gauge” that I had designed and built was used to efficiently measure case necks down to zero tolerance in just seconds or to discover dangerously-thick case necks that could cause increased chamber pressure. On the urging of John Amber, Gun Digest editor, these gauges were later manufactured and

sold worldwide. I continue to use it today. Far At bottom, a Marquart factory-issue mandrel.

At top, a special modified mandrel as used in a Marquart neck turning tool with the longer main shaft to be used in lathe chuck. This mandrel also has a built-in case mouth stop (shown at pencil point) used to control case neck turning depth in lathe.

PRECISION CASE NECK TURNING IN A LATHE CONTINUED

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Adjustment wrenches are at bottom. Following my earlier experience with the cartridge case neck, I authored an article for Handloader's Digest Ninth Edition (1981). Here I had made the comparison between reaming case necks and outside turning them. The work concluded, "Outside is Better." Pictured in the article was a special motor-driven, vertical minilathe that I had designed and built for the purpose of outside-turning case necks.

I make mention of this here to reiterate the importance that I had placed on the cartridge case. Cases can be precision turned in just seconds following setup. Cases are fully stabilized on a spring-loaded spindle and conveniently rotated for precise measurement. neck, particularly when it involved extreme accuracy. Let's move on to the fundamental details of a method of outside neck turning that I continue to use today.

In the process I use a modified conventional neck turning tool with an extended-length stepped mandrel held directly in the lathe

chuck with the mandrel extended. Most of the commonly-used outside neck turning tools are basically similar by design. They consist of a rectangular aluminum body approximately two inches long x 1 3/8 inches wide and a half-inch thick. A cutout is made at center to accommodate the case neck and shoulder.

There is a hole into the cutout where the mandrel is held in line with the case neck. In the turning process, outside case neck metal is shaved from the case neck as it is manually rotated between the mandrel spindle and the cutting blade. If performed by hand it is a very lengthy, time-consuming process. I'll show how it can be done in a lathe much more efficiently. Years ago I acquired a Marquart Neck Turning tool to be used with my modified neck turning mandrels.

While I used the same major shank size as the Marquart unit, I made up special stainless steel mandrels conforming to sized case neck shank diameter. The mandrels have a case mouth stop immediately beyond the cal-

iber-specific diameter. The mandrel case neck stop diameter is held just under outside case neck thickness to prevent cutting-blade interference. The new, extended mandrel shaft body extends through and beyond the tool body about 5/8" and is held in the lathe chuck while neck turning.

Modified Neck Turning Tool Each caliber-specific mandrel is turned to size to fit just inside a newly sized case mouth close to bullet diameter. A minimal amount of tolerance here does not interfere with precise neck turning. While outside neck turning, the case head is held coaxially in the lathe tail stock chuck. The case neck is then moved into the rotating cutting blade, over the mandrel, until it reaches the stop.

Altering neck wall thickness is done by making shallow cuts and re-setting the cutter-blade until arriving at the desired neck thickness.

PRECISION CASE NECK TURNING IN A LATHE CONTINUED

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It has been a valuable tool in the accuracy handloading process where extreme accuracy is the goal. Far The same care in setup procedure is observed as the blade nears the neck-shoulder juncture by moving the case neck stop in or out of the main tool body closer or farther from the blade. All this is quite uncomplicated and cases can be outside neck sized in just seconds. My average turnaround time is 15-18 seconds for cases turned to under a thousandths runout. As I 5 Creedmoor cartridge.

These groups were fired in a totally-accurized Model 12 Savage Single Shot rifle with an 8-32 Sightron scope. Case necks were turned to zero thickness variation in producing these

seven 100-yard groups as small as 0.094 MOA for a 0.268 MOA average. progress with the neck turning process I monitor thickness at intervals just to be sure all is well.

In the correct use of this method of outside neck turning, the increased neck wall thickening sometimes found at the neck shoulder juncture, commonly termed the doughnut, is conveniently removed. All that is required is to be sure the cutting blade on the neck turning tool cuts cleanly and fully just up to the case neckshoulder juncture. All this is quite uncomplicated.

Testing Outside Neck Turning Along with the other accuracy measures, it takes a great deal of planning to obviate the multitude of variables and possible accuracy-robbing deficiencies in a rifle. None the less, quality case necks and good bullet alignment area vital link in the accuracy chain that cannot be overlooked. I have developed a bulletcase alignment instrument whereby I can virtually predict the accuracy outcome of a rifle where case-bullet deficiencies area deciding issue.

It's quite awakening to witness how the effects of a canted bullet engaging the rifling leade at an angle will enlarge an otherwise perfect group on target. Turning necks precisely helps reduce this greatly. AG

PEOPLE & COMPANIES

Reader Forum

BY AMERICAN GUNSMITH EDITORS MAY 2018

ORIGINAL PP. 23-24

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Hard to Find Gun Parts I'm looking for a copy of Hard to Find Gun Parts by Leeroy Wisner. It's been out of print for some time and I'd like a used copy. I have checked Brownells, Amazon, and e Bay. I've even contacted the manufacturer Leeroy Wisner, all to no avail. Contact me if you know where I can find a copy. Gunsmith Wanted I have two Sako L691 actions with 24" barrels in my shop from a friend who wants them cleaned and sold.

The original owner had started making stocks for these, having sent the barreled actions to be blued, then bedded to his stocks. The components for this project were purchased new and started about 10-12 years ago but never finished. I've seen three of the stocks the original owner started. While only one was completed and ready to seal coat, he apparently was a talented stock-maker. I've seen some beautiful scroll work and checkering work and his was picturesque.

The issues I have at hand are minor surface rust on the actions, along with surface rust and more serious rust with pitting on both barrels after sitting so long. The bores appear clear of rust as they are coated with what appears to be a heavy black lubricant. I don't have the knowledge nor equipment to prepare these for sale. Whom would you recommend to contact? Author Paul Mazan responds.

All of my contemporaries have since retired so I could no longer recommend a gunsmith that I knew personally and would recommend. I suggest contacting Brownells. When I worked there they did have a list of gunsmiths from different parts of the country and can supply names, locations, and numbers. Check out the listings at

AmericanGunsmith.info/school-service as well. Jerry Spadorcio M1 Carbine Article "The M1 Carbine" by Paul Mazan (March 2018) was a nice article on the history but much was left out.

My Carbine has a flat bolt. Originally made in 1943 (I think) but modified post war. Yes, I know, it is a Blue Star import. Should the flat bolt need be replaced with around bolt, is this a simple switch or does the head space need to be determined again? How does one replace the flip safety with a push button safety? What's the best way to go about removing the adjustable rear sight and replacing it with a flip sight? I would also like to replace the bayonet lug with an earlier one.

This also means removing and replacing the front sight. How does one do that? My intent is to convert my Carbine back to what it was originally, not as modified. I got mine for \$250 so many years ago. I should have bought a pallet of them back then. Paul needs to do another article on this fine house gun. G. Thompson Author Paul Mazan responds. Thank you for your kind words. You are correct that my article was more about the history of the M1 Carbine than the gunsmithing details.

RK Campbell did an article covering many of the questions you have in the September 2017 issue. Assuming you do not have that issue, I will try to cover those questions here. It was discovered in WWII that extended use of the Carbine seemed to cause cracking of the right locking lug where it joins the bolt body. This condition became worse with the introduction of the M2 fully automatic version. The round bolt was introduced to beef the part up and reduce the incidence of cracking.

Your flat bolt is much preferred by collectors. As long as it shows no signs of cracking at the locking lug or any other dangerous condition, there is no reason to replace it. It is a simple switch but for safety's sake checking the headspace is always recommended. I have never installed a push button safety in the Carbine. In the 50s and 60s it was popular to sporterize Carbines.

Sporter-style wood stocks were available but with current collector interest centering on "as issued" examples and the high prices of them today, it is more popular to restore them to full military configuration than to make non-original changes that would lower the value of the gun. My understanding is that very early Inland-made guns did have push button safeties and I have seen the safety buttons available on Gunbroker.com.

There is a video available on You Tube that shows the disassembly of the trigger housing including the removal and installation of the safety at goo.gl/qqepVe. The instructions there make it a non-difficult job. The disassembly procedure is to first unload and show clear, then remove the barreled action from the stock by depressing the front band spring and sliding the front band forward. The barreled action complete with the trigger housing is then removed by moving the barrel up and away from the stock.

Remove the trigger housing assembly from the receiver by removing the retaining pin at the front of the housing and sliding the assembly forward. Make sure the hammer is in the forward (fired) position and compress the hammer spring by pulling back on the plunger that is inside the spring and against the hammer. Once clear Bill Mende

READER FORUM CONTINUED

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of the hammer, move it to the side and carefully move it forward, allowing the spring to relax. There are two pins in the side of the housing. Remove the forward pin from left to right and that will allow you to remove the hammer. Then remove the rear pin, releasing the trigger, sear, and spring. Pushing back on the plunger located at the bottom of the trigger housing allows pulling the magazine catch out of the housing.

After releasing tension on the plunger spring, the spring and plunger can be removed as well as the safety removed from the stock. Put in the new safety and reassemble, following the steps backwards. That YouTube video demonstrates how all these steps are done. Removing the rear sight and installing a flip style is no different than many other sights. The sights sit in a dovetail and are removed using a brass punch and driving the old sight off before installing anew sight in the dovetail.

The replacement of the front band is a more difficult task. To remove the band, first remove the front sight. The Army considered this a depot maintenance job because the front sight is crimped over both sides of the pin and the front sight key is staked at the rear. It can be done in the shop. Hold the barrel in a padded vise with the muzzle end sticking out beyond the vise jaws about one inch. Drive the front sight pin out from left to right using a 3/32 drift punch.

The sight is then pulled from the barrel using a special tool. Since this tool is not normally available, improvise with a gear puller by hooking it behind the sight and placing the pilot into the muzzle. Turn the handle to pull the sight off. Things get tricky if neither the military sight tool or a suitable gear puller is available. I have driven the front sight off using a brass punch while the barrel was held solidly in the vise.

That method will raise howls of derision from the purists and I wouldn't do it on somebody else's gun, however, sometimes a guy's gotta do what a guy's gotta do. AR-15 Technical Support Will the DPMS Oracle Barrel Assembly (Upper Receiver w/5.56 cal, Mfr Part: 60585, Brownells #231-000-339WB) fit a Colt AR-15 A2 Colt Carbine (serial number LGC 0086XX)? My Colt has the 1/4" pivot pin. Brad Thompson, Brownells Sr. Tech Support Gunsmith, responds. It will be a direct fit if your Colt is the standard 0.250" pivot pin.

During the "ban" period on the commercial side, Colt switched to a 0.315" pivot pin for awhile. I cannot determine your size by serial number, but you can measure to determine. Obviously, it's a direct fit at 1/4". If it's the larger size, it can still be made to fit a large pin pivot pin with the use of the 160-000-443 Conversion Kit Pivot Pin Assembly (goo.gl/Xz69Qx). Damaged Grip Panel?

I can't believe any competent gunsmith would destroy a walnut 1911 grip panel, say nothing of the frame, in the manner displayed in the center picture on the bottom of page 22 ("Pins And Screws", January 2018.) The most basic repair would be to remove the bushing, broken screw, et al. and replace both. This one photo discredits his competency and his entire article in my opinion. This repair job is likened to that of a "shade tree mechanic". Larry Krause Shooter's Service, Arkansas Author RK Campbell responds.

Thanks for reading American Gunsmith. You seem to have read much more into this image than was stated or implied. As I noted, screws break. It wasn't as bad a problem to remove the screw as I first thought. This gun arrived with the head of the screw broken, as illustrated, and it is something of a wonder it did not fall away. It broke off and fell into the shooters palm. I fail to see a scarred—much less destroyed—grip panel and a ruined frame is pretty imaginative.

John Tate As I noted in the article, a little finesse goes along way and you cannot damage the surrounding wood or metal. While my caption was simplistic I think you jumped to several wrong conclusions. Please read the feature. The images are intended to help illustrate the text. AG

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