SEP 2018

DIGITAL ARCHIVE EDITION

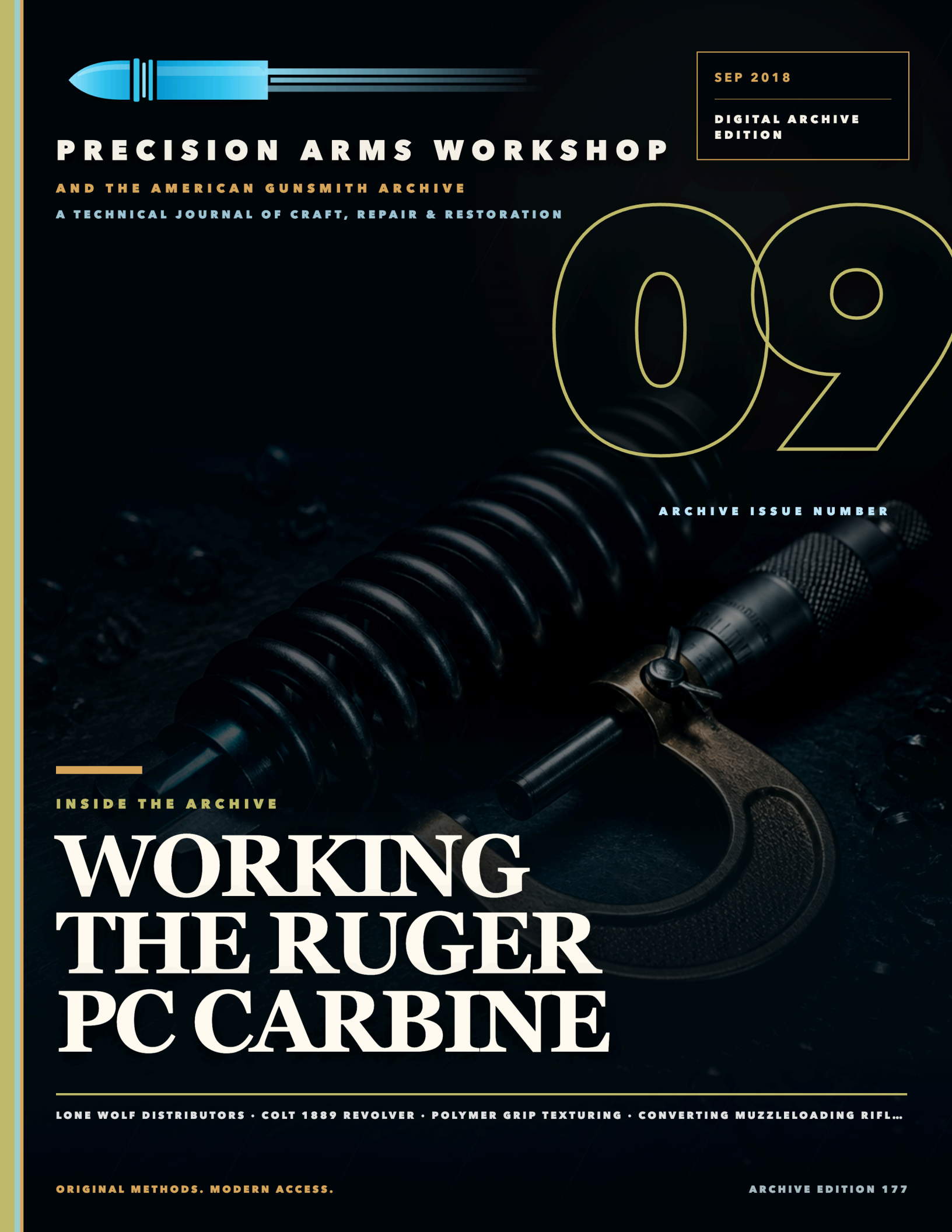
PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

A TECHNICAL JOURNAL OF CRAFT, REPAIR & RESTORATION

09

ARCHIVE ISSUE NUMBER



INSIDE THE ARCHIVE

WORKING THE RUGER PC CARBINE

LONE WOLF DISTRIBUTORS · COLT 1889 REVOLVER · POLYMER GRIP TEXTURING · CONVERTING MUZZLELOADING RIFL…

DIGITAL ARCHIVE EDITION

Preserved for the bench.

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AMERICAN GUNSMITH

DIGITAL ARCHIVE EDITION · SEPTEMBER 2018

ISSUE RECORD

ORIGINAL DATE	September 2018
VOLUME	Archive volume not stated
ISSUE NUMBER	09
SOURCE ID	ag-5bbe51876e43be7abfafff1a

DIGITAL EDITION

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

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

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A complete guide to the searchable editorial work preserved from September 2018.

HISTORY

Lone Wolf Distributors

BY AMERICAN GUNSMITH EDITORS SEPTEMBER 2018 ORIGINAL PP. 2

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Lone Wolf Distributors are offering three connectors for Glock handguns at a 50% savings over retail. The release of their newest Target (321-1) connector led to the creation of the Ultimate Connector Kit. This kit includes three 3.5 pound connectors (342 Original, 721 Classic, and 342-1 Target) and a six-pound trigger spring. Retail price for all three would be $58 but Lone Wolf sells them in a package for $28.92. The idea is to have three options for the optimum trigger in your project.

The 342 Original connector is an upgrade from Glock's 3.5# connectors with hundreds of thousands of units sold. Feedback from shooters led to the creation of the 342-1 Target connector. For those preferring it, the 721 Classic connector is an upgraded version of Glock's original "long minus" connector. Pair any of these connectors with the 6# trigger spring and trigger pull is improved. These fit all Glock Gen2 through Gen5 pistols except for G42/43. For the G42/43, Lone Wolf offers a 3.5# G42/43 connector.

Timber Wolf Frame The Timber Wolf frame can be a direct replacement for Gen3 Glock frames or used as the foundation of a custom-built Glock. Features and upgrades include a choice of two quick-change backstraps, rounded trigger guard, extended beaver tail, round mag catch, improved checkering, higher grip angle, and improved rail system. The Timber Wolf frame is the smallest, sculpted grip available for the Glock and works with Gen3 models. The Compact covers 19/23/32 and Full Size covers 17/22/34/35/17L/24/37.

The Timber- Wolf frame includes the basic parts unique to it and all remaining parts are standard "fit and function." A newer redesigned Timber Wolf frame is compatible with Gen3, 4, and 5 slides, provides 16 different grip configurations in full and compact sizes, choice of grip textures, and no finger grooves. For more information, contact Lone Wolf Distributors at Lone Wolf Dist. com or

PEOPLE & COMPANIES

Colt 1889 Revolver

The Colt 1889 is a precedent-setting double-action revolver designed before the Smith & Wesson patent. Here's what you need to know to work on them.

BY MARK R. HOLLENSEN SEPTEMBER 2018 ORIGINAL PP. 3-7

The Colt 1889 was introduced as the first double-action revolver with a swing-out cylinder. What is interesting about this old Colt is that the cylinder rotates counter-clockwise and that the design pre-dates the Smith & Wesson patent by seven years. This new design was purportedly very strong as compared to previous double-action revolvers, being manufactured in the .38 Colt and the .41 Colt in both Short and Long versions.

Assorted literature products found tells us that this particular design became the standard for all double-action revolver designs that followed it. This original design, although strong, had some lockup issues, mainly because the cylinder did not have cylinder lock notches or a locking bolt assembly. The lack of these components made the cylinder prone to rotating when being carried in a pocket or holster—and even while shooting. Later, this design had the cylinder locking lug notches added to the cylinder.

With the addition of the bolt and bolt spring the revolver then became known as the Colt New Navy Model of 1889. After the Army adopted and purchased the revolver, the design became known as the Colt New Army & Navy model of 1892. Colt then made improvements to the 1889 design, with each version being assigned its own model number, such as the 1894, 1895, 1896, 1901, and 1903 models. This design of swing-out cylinder revolvers were very popular with the public and as military issue.

Several hundred thousand revolvers of this design were sold. 41 caliber revolver. The finish was previously removed via a mechanical wire wheel brush. Having such an important part of Colt firearms history make it to my bench (again) renewed my interest in the original design—especially since this one appeared to be "all original." Yes, it was in poor shape finish wise, but seemed to still function OK, although it would not work in single action.

And, of course, the cylinder crane assembly was very loose, as with most of the 1889 models. This tired old Colt was visibly scarred by improper "gunsmithing"—and I use that term very loosely. Somewhere along the way, someone had used a mechanical wire wheel (and a harsh one at that) to remove all of the finish from the gun and it was done in such a manner that it left deep gouges and scratches all over the frame.

Although I was unable to verify this, I believe the revolver left the Colt factory nickel plated, which would account for a "reason" to wire wheel the finish off of the revolver, but this is only an assumption on my part. I also found both frame plate screws damaged as if someone had used gardening tools to try and remove them. Therefore, the visible exterior of the revolver, by way of the poor work done to it, pretty much doomed the collector value of it.

That said, I was pleasantly surprised to find it with all of its original parts inside, with the exception of one of the two frame plate screws. Posted parts view showed that both of the frame plate screws are identical when replacing (or ordering) them, so the fact that there were two different screws in the side plate led me to believe one of them was a non-factory replacement.

Since the remaining parts appeared to be original to the gun, I decided to photograph some of these parts for future use in either identifying used or available parts found, or for making new or replacement parts when needed. It should be noted here that the customer had left me with some

COLT 1889 REVOLVER CONTINUED ORIGINAL PAGE 4

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As a gunsmith, this is unacceptable and is a sure-fire method of going out of business quickly. There was no "care" used at all from what I could see. Maybe this was done when the revolver was thought to have no value? marching orders (that is, financial limits) when I took it in for potential repairs and I was in complete agreement with him on his imposed financial threshold.

I typically like to let the customer know that I will just go ahead and complete repairs if they fall at or below a certain cost 629" assembled this revolver at the factory. This number was found on nearly all of the parts. Note, the serial number can be found on the bottom of the grip frame. t hr es hold. Should the cost exceed that, I will notify them first to be sure that they want to move forward.

Just like my customers, I don't like monetary repair surprises—both for them and for me having to explain to them why I went way over their budget—so I always keep them informed as a repair moves along and within all previously set thresholds. As I had expected, the customer opted not to move forward with all of the necessary repairs this revolver was in need of. So, with all of that being said and in mind, let's get started.

Disassembly According to most of the published literature I was able to locate on this particular model revolver, complete disassembly is not advised or encouraged. Most of it is very basic, however, there are a couple of areas that you need to be cautious about

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and I will cover them when they come up during disassembly. Begin by opening the cylinder and checking to make certain there are no live rounds in any of the six chambers. Once you are sure the revolver is unloaded, begin by removing the grips or "stocks" (39). On this particular gun, the stocks are not original based on the location of the stock pin (36) holes in them that are not in the correct relationship to the frame hole. No stock pin was found in this revolver so it was probably lost.

I suspect that these grips are from a Colt New Navy rather than the original 1889. Moving on, carefully remove the crane lock screw (21) located on the right side of the frame. Once this is removed, pull out (or use a magnet) to get the crane lock (22) out. This will free up the cylinder/crane assembly, so just open the cylinder latch and remove the cylinder/crane assembly off of the frame by pulling it forward.

This is where published literature tells us not to go forward with disassembling the crane and cylinder latch assembly unless required to do so for repairs. I agree with this only because I had to do this on one in the past and it was all trial and error. When looking for replacement parts, this is an excellent photo for parts identification.

Literature tells us that after depressing the ejector rod (5) so that the ratchet/ ejector (4) clears the cylinder, the ratchet can be unscrewed from the ejector rod going in the clockwise direction and you will need to use a special spanner wrench to remove the crane bushing (7) from the crane (8). The revolver I had in previously was disassembled by gripping the ratchet with two small wooden blocks and then turning the cylinder until it released and this worked fine on that job.

The issue then becomes reinstalling the ratchet as you must get it back in the exact place it was prior to removal so that the stars on the ratchet fully seat in the cylinder face. Again, not a fun process and I recommend that you do not disassemble the crane and cylinder assembly unless you just have to. I was not/have not been able to locate the spanner mentioned in literature so I have no idea what to look for.

Moving on from the cylinder/ crane assembly (being set aside), disassembly of the lock mechanism is next. Begin by backing out the mainspring tension screw (20) from the front of the pistol grip frame, taking pressure off of the mainspring (19) as much as possible. Now, insert a nylon or wooden dowel between the sharp bend of the mainspring and back of the

COLT 1889 REVOLVER CONTINUED ORIGINAL PAGE 6

The spring is very fragile and prone to breakage. It must be solidly staked in place when repairing or replacing or it can get caught on the frame inside. This is also very vulnerable to breakage. pistol grip frame, essentially forcing the mainspring forks forward so that you can lift the stirrup (14) off of the mainspring hooks, releasing the stirrup from the mainspring. Once you have done this, remove the dowel you used and then lift the mainspring out of the notch it rides in on the grip frame.

With the mainspring removed, tilt the hand (27) rewards and lift it out of the frame. Now you can now cock the hammer (13) back enough so that you can pull it out of the frame, making sure that the firing pin clears the frame before pulling up on the hammer. It should be noted here that this is the second area that literature tells us not to remove the hammer pin (13A), trigger pin (26A) or rebound lever pin (31A) from the frame, as it is seldom necessary.

Once the hammer has been removed from the frame, you can now remove the rebound lever spring (32) by drifting the rebound lever spring pin (33) out of the frame from left to right. The spring will be under tension when you remove this pin, so the pin punch will get wedged into the hole when the pin is removed fully. Once your pin punch is out, the rebound lever spring comes right out.

With that removed, you can now just pull up on the rebound Troubleshooting This is by no means a complete list of troubleshooting tips as there a so many things that can go wrong with this revolver. Just remember that when it was assembled at the factory, each part was hand fitted by an "Assembler." In this case it was Assembler #629. This revolver came in for a problem with the single action not working but double action would. During my inspection, I found a number of things that were contributing to the problem.

One, the hand (27) was very well worn and the base of the hand was damaged and worn. Replacement was needed but not done on this job as the customer had set a repair costs limit and that alone exceeded the limit imposed. The hand spring (28) was bent and coming out of the slot in the hand where it was supposed to be staked into place. When installing the hand assembly, make sure the hand spring is not too short as it can catch on the frame inside and will cause the gun to become completely locked up.

Look for this if one comes in with the action locked up. The rebound lever (31) in this gun was also well worn. It had worn to the point that the trigger was too far forward and that was causing the singleaction functioning not to operate as lever (31) to remove it from the frame. Next, the trigger (26) can be pulled off of the trigger frame pin (26A) and removed.

To disassemble the cylinder latch (10) assembly, drift out the very small latch pin (11) in the frame and that will allow you to remove the latch and latch spring. This completes the disassembly of the revolver. Just reassemble in reverse.

4 ratchet/ejector 5 ejector rod 7 crane bushing 8 crane 10 cylinder latch 11 latch pin 13 hammer designed. I was able to shim the hole in the dog-leg portion of the rebound lever where it rides on the trigger pin and this caused the trigger to stay to the rear just enough so that the singleaction functioning started operating again. This was in lieu of replacing the rebound lever completely.

This shimming also had no impact on the double-action functioning either so 13A hammer pin 14 stirrup 19 mainspring 20 mainspring tension screw 21 crane lock screw 22 crane lock 26 trigger 26A trigger frame pin the revolver was able to operate just fine in single and double action.

The design of the revolver itself was mentioned previously as being poor, but the reason for that distinction is due to the fact that there are no cylinder lock notches milled in the cylinder nor is there a bolt and bolt spring—parts that are found in the "New" Navy Revolvers.

So without Colt 1889 Revolver (Speci ications subject to change without notice) 27 hand 28 hand spring 31 rebound lever 31A rebound lever pin 32 rebound lever spring 33 rebound lever spring pin 36 stock pin 39 grip this change in manufacturing, the original 1889 was prone to the cylinder spinning or turning when firing or carrying in a holster. This could lead to misfires or moving the cylinder over an empty chamber or an already-fired chamber.

Therefore, if you Sadly, no other parts list or schematic was located specific to the 1889. Parts are referenced here by number in the article. This parts view shows the bolt, bolt spring, and locking notches in the cylinder found on the redesigned New Navy model and not present on the original model of 1889. are looking for a good solid lockup on this revolver, look again as it does not lock up well due to the absence of the bolt and cylinder locking lugs or notches.

If you take one of these in for repairs, just let the customer know that parts are all but obsolete or extinct for this model and that a total re-work is all but out of the question due to the associated costs. But if you do take on the challenge, make your own parts (if you aren't able to just find some) and realize whether using shop-made or original parts that you'll have to hand fit them and that takes time.

It was a shame to see this old historical Colt in the condition it was in, especially since it appeared to have been originally nickel plated and along the way someone used a wire wheel to remove all of the finish. And poorly done I might add.

The good news here is that the revolver came to me with all original parts (with the exception of one of the two frame plate screws) and that alone can assist others with making parts or springs if/when needed as the accompanying photos should help with that if you run into one in need of them. This Colt reminds us that not all production guns were perfect from day one and demonstrates just how the upgrading or re-designing processes take place to eventually create a real workhorse or treasure.

My guess is that fielding a trial and error firearm in today's world would be met with lawsuits so steep that a company would not even get off of the ground. But this old Colt was made 120 years ago and in a rather different time… AG

PEOPLE & COMPANIES

Working The Ruger PC Carbine

Twenty years on, Ruger reboots its take on the Pistol Caliber Carbine, this time designing it to accept three different types of 9mm pistol magazines, including Glock.

BY BRIAN R. SMITH SEPTEMBER 2018 ORIGINAL PP. 8-15

Top: 1990s Ruger PC9 characterized by the trademark carbine barrel band at the front of the stock, receiver top milled for Ruger rings, and the magazine well integral with the trigger guard. Above: The new Ruger PC Carbine with its distinguishing rails at the front of the stock and the top of the receiver, fluted barrel, magazine well housing molded into the stock, takedown joint, and (thankfully) lack of barrel band.

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Top: 1990s Ruger PC9 characterized by the trademark carbine barrel band at the front of the stock, receiver top milled for Ruger rings, and the magazine well integral with the trigger guard. Above: The new Ruger PC Carbine with its distinguishing rails at the front of the stock and the top of the receiver, fluted barrel, magazine well housing molded into the stock, takedown joint, and (thankfully) lack of barrel band.

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Right: PC Carbine shown taken down into its basic groups. Stock/ receiver, forend/barrel, and magazine. The PC Carbine takes down in seconds.

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Ruger recently introduced its PC Carbine, a clean sheet upgrade/redesign of its former pistol caliber Police Carbines designated PC9 (9mm) and PC4 (sometimes referred to as PC40, in .40 S&W) made between 1996 and 2006. The "PC" in the new offering's name denotes "Pistol Caliber" and at the moment is offered in 9x19 only, but evidence of the design features of the PC Carbine suggest that other chamberings may be offered in future.

Before we examine the new PC Carbine, let's take a brief but closer review of Ruger's former entries into the pistol caliber long gun market, the PC9 and PC4. Those earlier Ruger carbines were designed as companions to their P-series pistols. Ruger sought to capitalize on the trend of many law enforcement departments of adding a carbine as an alternative or an addition to a shotgun for patrol cars.

Ruger P-series pistols used the same magazines and were offered in both 9mm and .40 caliber chamberings, marketing them primarily to police departments and selling them to private customers as well. The PC9 and PC4 outwardly resembled a Ruger 10/22, with the barrel breech end inserted into an angular receiver block and a black Stock/ receiver, forend/barrel, and magazine. The PC Carbine takes down in seconds.

Above left: Close up of the left side of stock and receiver showing the mag well housing molded into the stock, left side of bolt with slot for operating handle, and reversible magazine catch set up for right-hand operation. Bolt hold open is the kidney-shaped metal tab between mag well housing and trigger guard. Above center: Right side of stock and receiver with ejection port, magazine release button, and operating handle. Bolt hold open is pressed upward into the stock engaging the bolt and is not visible. Above right: Close up of the bolt hold open tab in front of the trigger guard reminiscent of the safety on an M1, M14/M1A, or Ruger Mini-14.

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Below left: The large-aperture ghost ring rear sight, fully adjustable for windage and elevation, is identical in features and operation to the Williams WRGS sight. Below center: The PC Carbine front sight is tactically/ militarily inspired with its substantial blade and robust protective ears. Below right: On models available in states allowing it, the muzzle is threaded 1/2-28 for a suppressor and is protected by a knurled ring held in place by friction provided by an O-ring. Different models offer either unthreaded (left) or threaded (right) muzzles.

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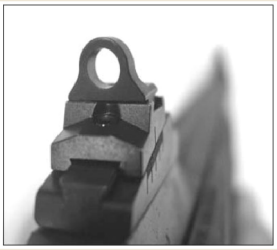

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Bolt hold open is the kidney-shaped metal tab between mag well housing and trigger guard. Above center: Right side of stock and receiver with ejection port, magazine release button, and operating handle. Bolt hold open is pressed upward into the stock engaging the bolt and is not visible. polymer stock wearing the seemingly obligatory trademark Ruger carbine band.

The receiver block differed from the 10/22 receiver by having a projecting rib featured dimples for Ruger scope rings and a projecting magazine well in front of trigger guard as part of its casting. The magazine seated at a pistol-grip angle and was latched in place by Below center: The PC Carbine front sight is tactically/ militarily inspired with its substantial blade and robust protective ears. Different models offer either unthreaded (left) or threaded (right) muzzles. an external magazine catch reminiscent of that found on an AR-15/ M16 magazine well. The Police Carbines were a good idea that had practical appeal extending back to frontiersmen and cowboys carrying a revolver and long gun both chambered in .44-40, although at that time ammunition manufacturers typically offered mild loads for the revolvers and stouter loads for the rifles and owners of the combo sometimes carried both types of ammo.

Marlin blew the dust off the concept in the 1980s with its Camp Carbine line, with the Camp 9 using the relatively-common S&W 59/5900 15-round 9mm magazine and the Camp 45 being fed by ubiquitous 1911 magazines. Marlin's success with the Camp Carbines was mixed at best; the selection of the S&W 9mm double stack magazine forever tied the Camp 9's fortunes to the success of the S&W line of semi-auto pistols.

The market for such "wondernines" included other popular high-capacity handguns, such as the Beretta 92, the Ruger P-series, the Browning High Power, the SIG P226/P228, and the polymer newcomer from Austria, the Glock 17/19. Inevitably, too many choices translated into mediocre sales for Marlin and the Camp Carbines were removed from production. Unfortunately for Ruger, the Police Carbines in 9mm and .40 S&W befell a similar fate. Sales of

Above left: Underside of the stock in the area of the joint between the stock and forend. The takedown lever is between the two captured disassembly screws. Above center: The PC Carbine in takedown "separation" position. Takedown lever has been pushed forward and the forend and stock sections have been rotated such that they can be pulled apart. Above right: Forend and stock separated. Three male lugs of the "bayonet" takedown joint are visible on the breech end of the barrel.

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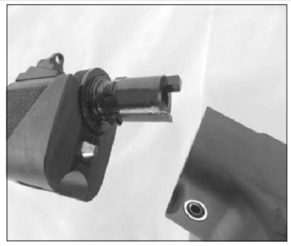

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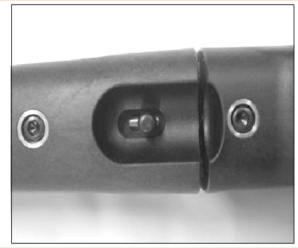

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ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

Below left: Buttstock with one recoil pad spacer fitted. Below: Forend showing auxiliary rail and anti-slip molded in weak hand grip areas.

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Below left: Buttstock with one recoil pad spacer fitted. Below: Forend showing auxiliary rail and anti-slip molded in weak hand grip areas.

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The takedown lever is between the two captured disassembly screws. Above center: The PC Carbine in takedown "separation" position. Takedown lever has been pushed forward and the forend and stock sections have been rotated such that they can be pulled apart. Three male lugs of the "bayonet" takedown joint are visible on the breech end of the barrel. PC9 and PC4 units depended on departments and civilians who selected the Ruger's P-series handguns. Again, too many choices faced buying departments and individuals.

In many cases the selection of a competitive pistol precluded the purchase of a Ruger Police Carbine due to magazine incompatibility. Ruger faced stiff competition from another direction, too. Following the uptick in worldwide and domestic terror in the aftermath of the September 11 attacks, departments were increasingly equipping patrol vehicles with variants of the AR-15, rendering handgun/carbine ammunition and magazine commonality a moot point.

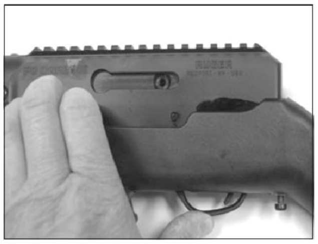
In 2017, Ruger marketing and engineering personnel rethought the pistol caliber carbine concept. The result is the new PC Carbine which hit the market in quantity in the first quarter of 2018. Chambered in 9x19, the PC Carbine is true Ruger in its modularity of design and construction and it represents a revolutionary improvement over the previous PC9 Police Carbine.

PC Carbine Differences This might be a good place to mention that some people in social media erroneously refer to the new PC Carbine as a "PC9" but the latter was the formal designation of the earlier Ruger Police Carbine. At a glance, the PC Carbine resembles the earlier PC9, however, closer inspection reveals a number of differences.

The CNC-milled, aerospace-grade 7075-T6 billet aluminum receiver includes an integrated Picatinny rail and is Type III hard-coat flat-black anodized for corrosion protection and durability. There are slots on either side of the receiver for the shooter's preference of mounting the operating handle to the slide—left or right.

Moving the operating handle is as simple as using the included 5/32" hex wrench to loosen and remove the cap screw inside the hollow operating handle and relocating the handle to the opposite side. The ejection port is on the right. There is a flat sheet metal tab between the trigger guard and magazine well that makes one think of an M1 or M14 safety but it is an ambidextrous bolt stop for manually holding the bolt open.

The cold hammer-forged, nitride-coated chrome-moly steel barrel is fluted for strength without the expense of weight and mounts an ear-protected front sight and fully-adjustable, sliding-ramp rear sight with windage-driftable ghost ring insert. At the muzzle on most PC Carbines is a 1/2"-28 thread protector held in place by an elastomer O-ring in the event the department or indi-



Above left: Takedown of the stock/receiver group. Loosen the capture screws in front of the magazine well housing and behind the trigger guard. Ruger provides a 5/32" hex key. Above center: With the stock/receiver group screws loosened, hold the stock and push up on the trigger guard to lift the receiver from the stock. Above right: Receiver and stock separated by means of the 5/32" hex key.

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Below left: Once the receiver is out of the stock, the magazine well is removed by pushing in the magazine catch with the thumb and simultaneously pushing the mag well upward using fingers inserted into the mag well from the bottom. Below center: Magazine wells are identified by Ruger at the forward bottom edge. The Glock 9mm version is shown. Below right: Receiver assembly removed from the stock. The ends of the pins holding the trigger guard in place are visible at the lower left.

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Note that Ruger makes a separate model of the PC Carbine with a non-threaded muzzle made for sale in states that prohibit muzzle devices and suppressors. The end of the barrel on the unthreaded muzzle version is machined to resemble a thread protector and at a distance the two models appear identical. The black pistol-gripped polymer stock is noteworthy in that it is split in front of the receiver, indicating a take- Below center: Magazine wells are identified by Ruger at the forward bottom edge.

The Glock 9mm version is shown. The ends of the pins holding the trigger guard in place are visible at the lower left. down feature lifted directly from the 10/22 Takedown, and scaled up appropriately. The rear half of the stock enclosing the receiver also features a downward-projecting magazine well with radiused front and rear surfaces that create a reasonably comfortable single-finger grip point. The forend has molded-in non-slip texturing, so fans of stippling polymer can put their woodburning pens away.

Thoughtfully included is another short Picatinny rail on the underside of the forend tip for mounting a laser or light. The buttplate is rubber with one 1/2" thick spacer fitted and Ruger ships the PC Carbine with two more spacers for those shooters with ape arms. T-Rex can remove the factoryfitted 1/2" spacer to shorten the length of pull, which would also fit younger and small-statured human shooters.

The most notable feature of the PC Carbine which completely separates it from the constraints that crippled PC9/4 and Marlin Camp Carbine sales is a system of interchangeable adapter inserts Ruger calls “magazine wells” that fit in the stock. Magazine wells can accept either Ruger Security-9/SR9, Ruger American Pistol, or Glock 17/19 magazines. Each PC Carbine ships with magazine wells for SR9 and Glock 17/19 magazines; Ruger American Pistol magazine wells are available from Ruger online at ShopRuger.com.

Disassembly Referring to the multi-view exploded parts diagrams in the PC Carbine manual (available for free from Ruger, download at bit.ly/2Li16E0), disassembly entails pulling the charging handle to the rear and latching the bolt in place by pushing the bolt stop up. Invert the weapon and push

Above left: Operating handle held in place by a hex inset machine screw accessed through the end of the operating handle. It must be removed before the bolt can be taken out of the receiver. Degrease the screw threads prior to reassembly and snug up the machine screw. Advise customers to check the screw for tightness regularly. Above center: To remove the bolt, insert thumb or finger between the buffer plate and the rear of the receiver. Pinching the buffer plate between thumb and forefinger, lift up and backward to remove the bolt. Above right: The PC Carbine's bolt, recoil spring, and buffer assembly shown as removed from the receiver.

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Below left: The recoil spring is captured by a multi-tabbed plate that slides into the top of the bolt and readily slips out to the rear revealing the tungsten alloy dead blow mass in a cavity in the bolt. Below right: Top view of the bolt exhibiting the tungsten dead blow mass at left (with two rows of five small holes) and two bolt head retaining pins at right. A smaller single pin at the lower right retains the extractor.

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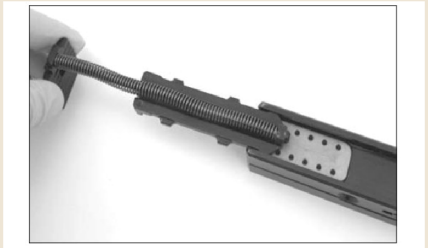

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Pinching the buffer plate between thumb and forefinger, lift up and backward to remove the bolt. forward on the locking lever, rotating the barrel/forend section counterclockwise in relation to the receiver section. Pull the barrel/forend section forward and out of the receiver. Note there are three robust lugs on the rear of the barrel/forend assembly that mate to slots in the receiver.

Pull the charging handle fully rearward and release the bolt forward and place the safety "on." Use a 5/32" hex key to loosen the captive takedown screw inside the A smaller single pin at the lower right retains the extractor. brass escutcheon in the underside of the forend. Separate the barrel assembly from the forend. Use the same 5/32" hex key to loosen the two captive takedown screws behind the trigger guard and in front of the magazine well boss molded into the buttstock. Lift the receiver from the buttstock.

Removing the magazine well by depressing the magazine release button. If a Ruger magazine well is installed, depress the magazine latch in the front center of the magazine well also. Lift the magazine well straight up and out of the buttstock. Remove the trigger guard by drifting the two trigger guard retaining pins out to the left. To remove the bolt, place the receiver upside down on a mat or cloth to protect the finish.

Make certain the bolt is fully forward by grasping the charging handle, pulling the bolt partially rearward, and releasing the charging handle. Remove the charging handle by using a 5/32" hex key and loosening the cap screw inside the charging handle. Remove the cap screw and charging handle. Place a finger between receiver and buffer, push the buffer forward slightly and lift the buffer/recoil spring/bolt assembly up and out of the receiver.

To disassemble the bolt, slide the multi-tabbed "bolt top" assembly with recoil spring out of the bolt to the rear. At the breech end of the bolt, press in on the bolt head and invert the bolt to allow the bolt head retaining pins to drop out. Force from the firing pin return spring holds the pins in place. Push in on the extractor in the area of the extractor spring and remove the extractor pin from the top of the bolt. Carefully release the extractor so

Above left: Gloved fingertip on the boltface, which is an insert-like metal injection molded (MIM) separate component and not machined into the bolt itself. Above center: In keeping with the extensive modularity, Ruger engineers designed the bolt head as a separate component, easily removed by first pressing the boltface to the rear against firing pin spring force and tipping the bolt over to allow two loose-fit, large-headed retaining pins to fall out. Above right: Hinged extractor can be dismounted by applying slight inward force on it and prying the extractor axis pin out. Carefully ease off restraining force from the extractor and remove extractor and spring.

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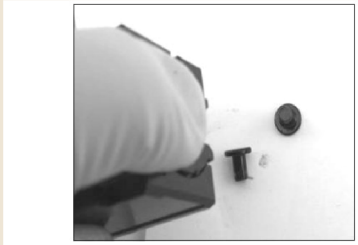

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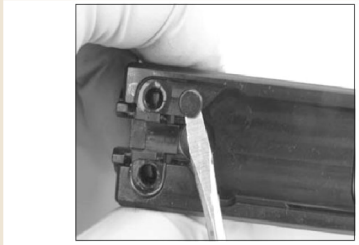

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Below left: Extractor, axis pin, and extractor spring removed from the bolt. Note the extremely small extractor hook on the fine blanked and deburred extractor at lower left. Below center: With extractor removed, the bolt head can be withdrawn from the front of the bolt. Below right: With bolt head removed, the firing pin and its return spring can be removed from the front of the bolt.

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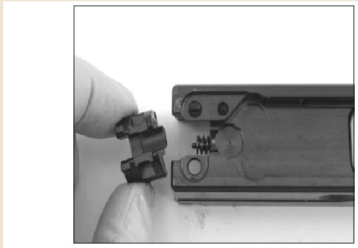

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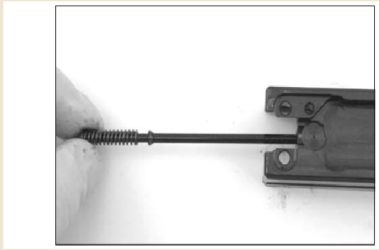

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Above center: In keeping with the extensive modularity, Ruger engineers designed the bolt head as a separate component, easily removed by first pressing the boltface to the rear against firing pin spring force and tipping the bolt over to allow two loose-fit, large-headed retaining pins to fall out. Carefully ease off restraining force from the extractor and remove extractor and spring. as not to launch it or the extractor spring. Remove the bolt head, the firing pin return spring, and the firing pin.

With the firing pin removed, remove the silver-colored dead blow weight. Trigger group components are quite reminiscent of those in the 10/22 and takedown of the trigger guard assembly is very similar as well. Restrain the cocked hammer, pull the trigger, and ease the hammer forward to release the compressed hammer spring. Remove hammer spring and

Below center: With extractor removed, the bolt head can be withdrawn from the front of the bolt. strut.

The hammer and trigger are removed by driving out their respective axis pins, taking care to control the trigger return spring. The Ruger PC Carbine features an adjustable takedown mechanism to ensure a snug fit between the barrel/forend assembly and receiver/buttstock assembly. This comes pre-adjusted from the factory but should adjustment be necessary, it is carried out as follows.

First, with the barrel/forend assembly separated from the receiver, loosen the adjustment knob by turning it counterclockwise when facing the knob from the muzzle end of the barrel/forend assembly. Next, assemble the receiver/buttstock and barrel/forend assemblies and ensure that they latch. Finally, tighten the adjustment knob by turning it clockwise until the two assemblies are firmly secured together. Do not use tools!

The adjustment knob is to be rotated with fingers only and employs an elastomer O-ring to prevent loosening in service. I mentioned modularity of design earlier. Now that the PC Carbine has been disassembled, one can see how truly well thought out the design really is.

For example, the bolt is a machining that is primarily a "receiver" in its own right, in that it serves as a carrier/platform for the firing pin, the detachable bolt head that engages the cartridge case head, the extractor, and what Ruger refers to as a "dead blow weight"—a powdered metal or metal injection molded (MIM) heavy tungsten alloy mass that rests in a recess in the rear of the bolt. The dead blow weight moves slightly fore and aft inside

Above left: The firing pin "keeps" the tungsten alloy dead blow mass in place in the bolt. With the firing pin removed, the tungsten mass can be removed as well. The mass is uni-directional end-to-end and does not need to be reinstalled in any particular direction. The passage for the firing pin is drilled off-center on the long axis requiring the mass to be installed with a particular side up to allow the firing pin channel in the bolt and mass to be aligned. Above right: If required, the recoil spring assembly can be broken down by depressing the buffer plate and removing the C-shaped polymer retaining ring from the guide rod. Ease off restraining force on the recoil spring and then slip the spring off the guide rod and the guide rod out from the front of the multi-tabbed bolt top.

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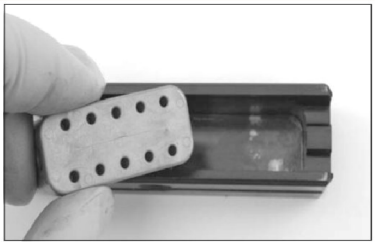

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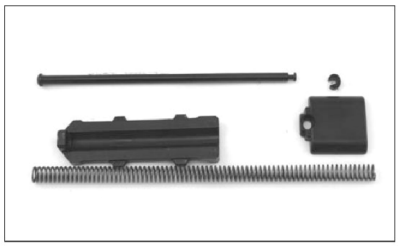

Below left: Exploded view of the recoil spring/buffer assembly components showing the guide rod, bolt top, recoil spring, retaining ring, and buffer. Below right: Trigger guard is removed from the receiver by slip-fit pins. The internal components will be familiar to anyone with 10/22 experience.

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Ease off restraining force on the recoil spring and then slip the spring off the guide rod and the guide rod out from the front of the multi-tabbed bolt top. the bolt, which suggests that the dead blow weight imparts an extra "bump" of an impulse to the bolt as a cartridge is chambered. This is a thoughtful design feature which should improve functionality but primarily it means that a lowerforce recoil spring can be used.

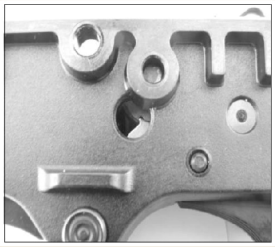
In blowback actions, the rearward force of the discharged cartridge is countered by bolt mass and recoil spring force. The lower the bolt mass, the higher the required The internal components will be familiar to anyone with 10/22 experience. recoil spring force. In the case of the PC Carbine, the higher the bolt mass allows a weaker recoil spring force to be employed. This makes it easier to rack the bolt and charge the weapon.

However, a weaker recoil spring can compromise cartridge feeding by failing to ensure the bolt fully closes into battery. The heavy tungsten alloy mass that is free to move perhaps 1/8" provides an extra "kick" of force that makes up for the lighter spring. Clever design. There has been speculation on firearm social media platforms that such modularity will ultimately lead to Ruger's introduction of PC Carbines in .45 ACP, .40 S&W, etc.

It has been noticed that the tungsten alloy dead blow weight has a molded-in "1" which has led some to contemplate that other variants marked with different numbers may be in the works. Could be, or it could also just be the current revision number of the dead blow weight mould tooling, In typical practice, if an engineering change was warranted for any reason, the revised P/Mor MIM tooling punches would be marked "2" to denote the change.

Time, market acceptance of the 9mm PC, and demand for the PC in other chamberings will tell. Range Report To correctly state an often-misquoted adage, "the proof of the pudding is in the eating." No review of anew firearm would be complete without a range report. Because I have no SR9 magazines, I exchanged the magazine well for the Glock unit and headed for the range along with several Glock 17 and 19 magazines pre-filled with a number of 115 grain FMJ and 124 grain JHP loads.

Weather conditions were "Pennsylvania Winter," meaning that while at the range for just under an hour, the PC Carbine and I experienced rain, snow, sleet, graupel (big sleet), and hail. Don't like it? Just wait five minutes. The weather did not adversely affect the Ruger PC Carbine. In just over 200 aggregate rounds fired, there were no failures of any kind. I did not post paper targets, rather opting for shooting at four-inch gongs at 25 yards, eight-inch



Above left: Side view of the trigger housing illustrating a hole in the sidewall that Ruger thoughtfully placed to permit viewing sear surface engagement and lubrication. Above right: For disassembly, restrain the hammer, pull the trigger, and ease the hammer forward to release the mainspring and its guide rod. The guide rod is already a deburred, fine-blanked component but polishing further could further remove friction.

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ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

Left: With the mainspring and guide rod out, the hammer and trigger axis pins can be removed, freeing those components and providing access to all other trigger group parts.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

The guide rod is already a deburred, fine-blanked component but polishing further could further remove friction. gongs at 50, and alone one-foot diameter gong at 100. In terms of accuracy, the Ruger clearly did better than I could hold it as I shivered or strained to see through the precipitation. Still, I was rewarded with the solid "thunk" of lead on steel over 85% of the time at any of the three distances to target.

The handy Ruger was almost boringly accurate in a practical "minute of coyote or wild pig" sense but shooting for record on paper will have to wait for not-so-heavy weather. The PC carbine was indeed handy, coming to both shoulder, cheek, and on target as near simultaneously as possible. The balance point is almost exactly through the magazine well boss.

The right amount of pull for me was provided by the single factory-installed buttplate spacer and the amount of rise on the comb made for a perfect cheek weld for me with the ghost ring rear sight and military-style, ear-protected, generously-wide front post. Sighting the Ruger PC Carbine is not unlike sighting an M1 or AR-15 with standard irons.

I did not have time to fit an optic but the cast-in Picatinny rail in the center top of the receiver ensures that your choice of target acquisition device will be right at home. The barrel is substantial in diameter but with weightsaving flutes machined most of the length and the steel bits are finished in what appears to be a nitride coating. Combined with the polymer stock and forend, the PC Carbine is robustly protected from the elements.

The PC Carbine hit the market January 2018 and had very few problems reported within the first five months that I could find. These were limited to a couple of reports of a broken firing pin and a broken extractor tip. There are a few videos documenting what owners are purporting to be "failures" of the PC Carbine but in reality were proof of operator error or failure to read and comprehend the instructions in the owner's manual.

One such video shows the PC Carbine "shooting loose" at the takedown joint, however, the remedy for that is adjusting the knurled nut at the breech end of the barrel to snug up the takedown fit, as described on page 37 of the manual. The most striking attribute about the PC Carbine is a departure from along-standing tradition/policy of Ruger using only proprietary magazines and offering the ability to accept interchangeable magazine wells.

It's one thing to make inserts for Ruger American and SR9 pistols but Ruger has taken the unorthodox step of shipping the PC Carbine with a magazine adapter for the competitor Glock 9mm magazines. This is a masterstroke strategy on Ruger's part because a non-AR-based semiauto pistol caliber carbine that accepts Glock mags from a major US firearm manufacturer opens up abroad market of Glock owners to whom the idea of a carbine using G17 or G19 mags can be very appealing.

It certainly was the primary reason I purchased a PC Carbine myself; the Glock 19 is our "family carry pistol." AG

FROM THE ARCHIVE

Polymer Grip Texturing

Using the SIG 320 as an example, I'll show you a novel method for enhancing the grip on polymer pistols.

BY CHARLES PARKER SEPTEMBER 2018 ORIGINAL PP. 16-19

As a competitive shooter I have always sought a better gripping surface for my firearms. I am not a fan of wearing gloves in most situations and the problem of sweaty or wet hands due to weather conditions has always plagued me. The last thing I need is something else influencing my shot process or plan of action. After three months during which I made a complete transition to the SIG SAUER P320 for the majority of my shooting, I started experimenting with improved the gripping surfaces.

I have done some stippling in the past and while that generally works and looks fine, I found that on the P320 and other polymer-framed pistols stippling did not offer a drastic enough improvement for my needs. From the factory the SIG P320 has a decent texture that is excellent for carry and most general purpose shooting. But for competition in both Bullseye (NRA Precision Pistol) and USPSA matches, I wanted some heavy duty traction.

I needed something that would allow for a solid, no-movement grip under even the most extreme conditions. I have tried grip tape from various manufactures with various textures but none of them seemed to offer the permanent solution I was looking for. Researching different gripping surfaces online I developed a plan and put it into action. I started with some various epoxies from the hardware store. Most were two-part epoxies that were easy to mix with a craft stick and then apply.

After experimenting on several surfaces I settled on J-B Weld Original Cold Weld Epoxy. In It looks fine and enhances purchase but wasn't enough for me. 2,000 rounds and hundreds of presentations present almost no wear. addition, I went to Harbor Freight and picked up a box of aluminum oxide. This material would make up the actual gripping surface that would be similar to a fine grade sand paper.

My initial attempt with the aluminum oxide turned out a little rough around the edges but was the perfect surface texture that I was looking for and it was permanent. Taping off the edges and following a clean edge line proved a little more difficult than expected. But all and all, I wasn't as concerned about "looks" as much as I was function.

This first attempt with aluminum oxide now has had about 2,000 rounds through it and has been riding in a Safariland GLS holster with several hundred presentations and shows minimal wear. The gripping surface has smoothed out a little but still is excellent with sweaty or wet hands. I have not seen any breakdown of the material, not even around the edges. Oil and cleaning residue has not affected it yet, but only time will tell.

I decided to really take some time and do a couple more to see just how good a job I could do. The best thing about the SIG P320 frames is, if you screw it up, you are only out $35-$40 bucks so my thought was, "No big deal, let's do it!"

POLYMER GRIP TEXTURING CONTINUED ORIGINAL PAGE 17

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Best to remove the tape after letting the epoxy set for only one hour. Far The black frame for my SIG P320 .45 ACP was up. The residue around the edge is from masking tape that had been left on during the complete curing. While J-B cures in 48 hours, I let this set five days just to be sure. All done, it turned out very well.

One thing I discovered later is that removing the edge tape after approximately letting the epoxy set just one hour—instead of waiting the full curing time—makes it easier to remove all the tape with no left over residue while allowing for a sharper edge. Dress up work can readily be done while the epoxy is still a little tacky. Wanting to do an even nicer job, I moved on to another frame and it went even better. Removing the tape after one hour or so clearly made a difference because the epoxy is still pliable.

Carefully pressing the edges down and then reapplying aluminum oxide to the grip frame works very well. Process Guide To help you do this while avoiding my trial-and-error mistakes, I have prepared a step-by-step process here to guide you through. For tools and equipment, you'll need a good two-part epoxy (I recommend and use J-B Weld), aluminum oxide or silicone carbide, a hobbyist sculpting/paint kit, 3/4-1" masking tape, 2.5-3" foam roller, and a container for bedding the frame.

Start by taping off the areas on the frame that you do not want epoxy to go. Taping around edges of grip and around the magazine release proved pretty simple. Trim these areas with an X-Acto knife or fine razor blade. Concerning masking tape, I initially tried using blue tape used for painting because I thought it would make it easier to remove but this was not the case at all! The blue tape does not stick well enough for our purposes and when epoxy is applied over it, the tape wanted to start peel-

POLYMER GRIP TEXTURING CONTINUED ORIGINAL PAGE 18

ing up. Use standard masking tape such as from 3M. Once everything is taped off, start by applying a thin layer of epoxy to the areas where the aluminum oxide will be applied. I find that using Below left and center: Start with a thin layer of epoxy. Plastic sculpting tools leave a nice, smooth edge. Don't use too much or you'll thin the epoxy too much. plastic sculpting tools leaves a softer edge to be smoothed out later. There may be better tools for this but these have worked well for me so far.

When smoothing the epoxy surface, I find that leaving vertical lines from the Next, use a small cup to pour the aluminum oxide over the surface to coat it. Be careful not to pour too much at one time or too fast or it will disturb or "thin out" the surface where it hits the grip. Once there is an even coat of aluminum oxide covering all desired surfaces of the grip, use the foam roller on the surface to smooth out the vertical lines in the epoxy on the grip that were left when it was applied.

Don't press too hard on the surface as this Far Painter's tape doesn't adhere to polymer well and curls up when epoxy is applied. slide release area to the magazine well work best to even out the surface and epoxy, resulting in a more even coat on the entire gripping surface.

POLYMER GRIP TEXTURING CONTINUED ORIGINAL PAGE 19

Above center: After an hour's wait, remove the masking tape, clean up the edges, and re-apply of bit of aluminum oxide. I prefer to wait five days. would disturb the uniformity of the epoxy coverage. Prepare a small bucket or dish with a bedding of aluminum oxide. Carefully place the frame onto the bed and gently pour more aluminum carbide over the grip until it is completely covered in the material.

Be very careful and do not pour the aluminum carbide too quickly or to apply pressure to the grip frame when placing it into the bedding. Any type of excess pressure will disturb the epoxy surface that you just smoothed out. Wait about an hour. I highly suggest waiting no more than this or it will become difficult to remove the masking tape and clean up the edges.

Waiting too long will have the epoxy Thousands of rounds later, the grip surface is holding up well. and aluminum oxide coming off in small chunks and ruin your nice edges. When ready, carefully remove the grip frame from the bedding dish and remove the edge tape carefully and slowly. Use your finger to lightly press on the edges to sharpen them up. Pour additional aluminum oxide over the edges to coat any exposed epoxy and place the frame gently into the bedding dish.

Re-cover the frame in aluminum carbide as before. Now the hard part is finished and all that's left is to wait. I prefer to let the frame sit overnight in aluminum oxide and remove in the morning. Hang the grip to let the epoxy completely cure. I prefer to give it five days, although that is probably overkill. After curing check out your work. My observation has been that aluminum oxide will shed a bit during the first week with normal handling and then be "stable" after that.

The frames pictured here have now been used for thousands of rounds and I have seen no real discernible wear. I have been very happy with this process. To date, I have done approximately 20 frames for friends and fellow shooters and they have been as happy with the results as I have. I hope you find this procedure helpful. It can be useful for any polymer-framed handgun. AG

RIFLES

Converting Muzzleloading Rifles

Converting most flintlock rifles to percussion or a rifle that has been converted back to flintlock is usually an easy job.

BY PAUL MAZAN SEPTEMBER 2018 ORIGINAL PP. 20-23

There have been many milestones in the development of firearms for both hunting and military use. Prior to the invention of the matchlock, it took the English years to develop archers that could both pull the famous longbow let alone hit anything with it. From the time a boy reached 13 years old he was given a longbow and by law had to practice with it every Sunday after church on the village archery butts along with all the other men.

All other games were outlawed because the development of the world's best archers was a matter of national security (where have I heard that phrase before?). Sometime in the first half of the 15th Century some bright spark found a way to set off a powder charge using a lever that held a smoldering piece of cord and the arms race was on! The matchlock wasn't really better than the longbow.

It was slower to load, not very accurate, and nearly useless in wet weather, but didn't require the arduous practice necessary with the longbow. Besides, you couldn't be a self-respecting, illustrious, potentate of a modern nation unless your troops were armed with the assault rifle of the age. It showed you were hip, upto-date, and anyone with lesser technology should fear for their crown. Well… not really. The well-practiced "savages" could easily put a dozen arrows in the air for every musket ball launched.

As with most military equipment decisions, the deciding factor was the ability to train musketeers in weeks rather than the years it took to train an archer, making more peasants available for the knights to stick with their lances in the name of chivalry. After a couple hundred years, firearms technology took a little side trip into the wheellock. However, these were so delicate and expensive even the kings couldn't tax their people enough to equip an army with them.

Having a wheellock was akin to having your own business jet today. Sure, some folks have them but they aren't common among soldiers. Around 1600, some enterprising person mated the flint and steel to the side of a gun barrel and invented When purchased, the gun had a percussion lock and double set trigger. the flintlock. The best parts of the flintlock were that it was simple, easy to make, and pretty darn reliable unless you found yourself fighting in a frog strangler of a downpour.

Best of all, it was relatively cheap. Even petty kings could arm their armies with flintlocks. For the next two hundred years, Europeans marched around slaying their fellow living things with flintlock muskets and rifles. Here in America, we didn't have noble knights and ladies but we did have a parcel of odd natives foolish enough to think the land was theirs just because they got here

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With the lock removed, you can see the drum and nipple of the percussion system is screwed into the barrel. first. We thought the flintlock was such a great invention we brought them all the way over from Europe just so we could introduce our red brothers to the wonders of modern manufacturing and kill them faster. The British looked at what we were doing and decided that us backwards, unruly, colonials needed some sophisticating and came up with the idea of gun control.

They heard we were accumulating guns in a couple of small towns and decided to go take them away from us. We didn't take kindly to that notion and a guy named George and a few of his buddies invited them to leave. Being polite Britishers, they took their cricket bats and went home. Along about 1820, some minister saw the light and was sure, being a man of peace and all, that he could come up with a faster way to kill folks. So, he invented the percussion cap.

The percussion lock was exactly what everyone had been waiting for ever since the Chinese invented sliced bread, oh yeah, and gunpowder as well. Shortly after the invention of the percussion cap everyone simply had to have one. No longer would you be able to knap apiece of chert yourself. You would actually have to go to a store and pay money to shoot your rifle. Every gunsmith on the frontier became a custom gunmaker and started converting all those old flintlocks to percussion.

In the case of the traditional flint, the gunsmith is simply changing the lock, drilling out the flash hole, and tapping it for a drum with a clean out screw. The job presents few problems, except for making sure the lock screws are spaced properly. If you can find a lock with the same hole spacing for the mounting screws and the same

CONVERTING MUZZLELOADING RIFLES CONTINUED ORIGINAL PAGE 22

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Holding a 2 1/2" x 2 1/2" piece of 1/8" steel in a vise, the edge is heated with a torch and the trigger face is forged with a ball-pein hammer. lock plate size and contour, the conversion is easy. If not, you will have to do some filling, inletting, and perhaps even make anew sideplate. The rifle pictured here is one I picked up at a local estate auction. Although pretty well done, it is a prime example of what happens when you don't do your homework on what you are building.

The rifle is a .32 caliber Southern Mountain Rifle, also known as a "Poor Boy" in Yankee or "Po Boy" down south. These rifles were traditionally unadorned and as simple as possible. The tail of the trigger was heated and a pair of needle nosed pliers used to simply twist a decorative curlicue in the bottom of the trigger. As good a job as the maker did making a beautiful rifle, he did make a few slips in recreating the style. However, it was his rifle and he was certainly free to make a gun that pleased him.

The first miscue is a nickel silver sideplate that he engraved his name and year of manufacture on. This should have gone on a steel plate because the nickel silver would simply have been seen as an extravagance. The double set trigger is also rarely seen on these rifles. Given I was converting it to flintlock, I also forged out a trigger. The lock I had on hand was nickel plated and I buffed the plating off and browned it as well as the sideplate and the trigger with Birchwood Casey Plum Brown.

Upon disassembling the rifle I discovered one other common problem I often see on modern-built muzzleloaders. The front action screw was installed too low in the stock. Getting the ramrod to go under it required almost 3/4 of the diameter of the screw to be ground away and the ramrod tapered. When locating the front action screw, it should pass just under the bottom of the barrel to leave room for the ramrod. The gun sports a steel buttplate.

Although I have seen some with no buttplate, I have seen many more with buttplates salvaged from some other junk yard metal. Could be that it once was a fender from a 1951 Pontiac. The project was not a difficult one, mostly requiring I inlet the works for the available lock. Unfortunately, the new flintlock was slightly smaller than the percussion that came off of the gun.

My first thought was to inlet some wood around the edges of the inletting but I ultimately decided to leave it so I could convert the rifle back to percussion if I wanted. Using the original sideplate as a pattern, I cut and fit anew sideplate. This is where extra caution is needed as the screw holes must be in exactly the right places so the screws fit into the

It isn't elegant but it is much faster than filing alone. lock. I have spoken to several others that have had the same problem with the front lockplate screw interfering with the passage of the ramrod. There are various fixes for this, from grinding the screw and tapering the ramrod to fit, all the way to simply soldering or gluing a screw head into the front hole in the lockplate and just holding the lock in place with one screw. I rather enjoy making simple triggers for my muzzleloaders.

I take a 1/8" piece of steel plate, cut into a 2 What you can't afford in technology can be made up for with hard work and a few tricks. The trigger plate is reduced in thickness every place but where the trigger pivots. Inletting of the lock was left oversized to allow conversion back to percussion.

The alternative is to glue thin pieces of wood into the lock mortise and reinlet the lock. 1/2 x 2 1/2 square, secure it in my vice, heat it with a torch to red hot, and pound it into rough shape with the pein end of a ball-pein hammer. After smoothing the face of the trigger with a file, a hacksaw makes the needed cuts to shape the plate. I leave along, thin tail on the bottom of the trigger which is later heated with a torch and bend into a curlicue.

The trigger plate is made out of 1/4" steel cut to length and width and a series of holes are drilled in the middle. The material between the holes is cleaned out with a file, leaving a slot for the trigger to pass through. Then it is drilled for the trigger pin and drilled and tapped for the tang screw. In the old days most of the conversions were done from flint to percussion. If you have a simple drum and nipple, the conversion back to flintlock is just as easy.

Take a screw that fits the tapped hole the drum was in and cut it to length. Then drill it with a large diameter drill from the barrel side to within 1/8" or so from the pan side. Drill a 1/16" flash hole in from the other side and you are done. One word of caution. This will not be so simple on guns like the Thompson/ Center Hawken with the hooked patent breech. All that is left is to fit the trigger and reassemble the rifle.

If you have been careful and planned ahead, you can actually convert the gun back and forth from flint to percussion and back again. AG

MEASUREMENT & INSPECTION

Reader Forum

BY AMERICAN GUNSMITH EDITORS SEPTEMBER 2018 ORIGINAL PP. 24

Winchester Model 50 A customer dropped off a Model 50 Winchester 20 gauge shotgun that is not feeding shotshells. The carrier does not move when cycling the bolt manually either. The carrier will move up with the finger pressure with the bolt release button depressed. The only reference source I have on this shotgun is from the NRA's Firearms Assembly books. While they go into great detail on the history of this firearm there aren't any trouble shooting guidelines.

Dean Cascio Overall the shotgun is in excellent condition and clean. The only part in the schematic that I can figure may be the problem is what they call the pawl that is pinned to the carrier. While it shows minor wear, it isn't beat up and shows no sign of modification. Anew part is not available. I have checked several sources. If necessary I can TIG weld and reshade. However, I am not sure how the pawl is supposed to engage the bottom of the bolt.

Do you know of anyone who is knowledgeable about these shotguns and could advise which way to go with this problem? Bob Cogan Accurate Plating & Weaponry If there's no revelation provided in Brownells Encyclopedia Of Modern Firearms, contact Nu-Line Guns (Nu- LineGuns.com, and ask for Jerry Stevens. Nu Line may also have the part. AR-15 Barrel Nut I understand the barrel nut tightens up against the lip on the barrel extension. The barrel can only be loose if the barrel nut is loose.

Does the barrel loosen in the pocket of the receiver after multiple firings? I have not seen this looseness on any of my barrels that I have installed and I would have to think this would be a common install practice if this is such a problem. Please explain. Bruce Finley Author Joe Carlos responds. The way you describe the barrel nut pushing back against the barrel extension, forcing it into contact with the upper receiver, is true.

However, we are not trying to stop front-to-back movement of the extension inside the receiver, we are trying to prevent side-to-side and up-and-down movement. You can see this movement as you assemble any Stoner rifle. Slide the barrel extension into the upper receiver until it stops, then hold the barrel in one hand and the receiver in the other and apply leftto-right and up-and-down forces. You will see and feel the wiggle. Thin shim stock held in place with green Loctite helps eliminate this movement.

Properly-fitted BAT Machine match barrel extensions will also remove this movement. Either method will reduce group size an average of about 1/3, which is very substantial. I suggest that you read the first article I ever wrote for this magazine, "Barrel Extension Diameter And Accuracy In The AR-15" (March-April 2013.). There is a story related in that article about how we discovered the amount of movement between the extension and the upper receiver in assembled uppers.

If you can't locate a copy of articles back that far in history or have any other questions, email me at G

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