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PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

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06

ARCHIVE ISSUE NUMBER



INSIDE THE ARCHIVE

SIG P210A

CELERANT KNOWLEDGEBASE • GUNSMITHING ADHESIVES • CUSTOM MUZZLE BRAKES • AMT HARDBALLER 1911

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 234

DIGITAL ARCHIVE EDITION

Preserved for the bench.

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FROM THE ARCHIVE

Celerant Knowledgebase

BY AMERICAN GUNSMITH EDITORS JUNE 2023

ORIGINAL PP. 2

Celerant has supported the firearms and outdoor sporting goods industries since 1999. Their retail software and e-commerce solutions support firearm retailers with an all-in-one store point-of-sale (POS) system which integrates with online sales and range management. FFL dealers can use a built-in electronic bound book or leverage third-party A&D/e4473 software integrations.

Vendor catalogs from numerous distributors can be imported with product display feeds in-store and/or online along with product uploads to your account with large online sales outlets. Celerant's solutions are preferred by NSSF, NASGW, and NRA as they support the hunting, archery, and outdoor industries with a commitment to do so long-term. Celerant recently added anew online, interactive knowledge base for the company's retail software.

The new self-service knowledge base provides instant access to training materials to help dealers better utilize their point of sale software so they can help customers and complete tasks faster, while reducing friction when needing training assistance. Celerant's knowledge base offers over 5,000 articles directly accessible from their retail software and client portal.

From within the retail software's point of sale and back office, users can enter keywords into a search box, or click the knowledge base icon next to the title of each software screen to learn more about that specific section of the software. The software will then open anew tab displaying a training article related to that software screen.

The knowledge base is also accessible from Celerant's client portal, which provides additional training and technical support resources, such as the Welcome Pack, how-to videos, release notes, product manuals, important announcements, my tickets, and much more. "We are excited to launch our new knowledge base," stated Robert Goldman, Vice President and CTO of Celerant Technology. "This year-long project was a process of converting every training manual and guide we have into an online, easily searchable resource by topic.

Instead of having to search through pages and pages of manuals, now our clients can simply type a few keywords and find the training answers they need. By offering more self-serving tools and new training materials, we are helping our dealers more effectively use our software with less uptime needed for newer users.

This is especially important now, considering many dealers are experiencing higher employee turnover than possibly ever before." Celerant's FFL retail software and knowledge base is available for both of their retail solutions: Cumulus Retail, a cost-effective option for smaller dealers, and Stratus Enterprise, a comprehensive solution with more functionality for larger dealers. For more information, visit [Celerant.com/firearms](https://celerant.com/firearms). Existing clients can start using the updated knowledge base at [Clients.Celerant.com](https://clients.celerant.com).

JOHN M. BUOL JR. AMERICANGUNSMITH.INFO

FROM THE ARCHIVE

SIG P210A

BY BRIAN R. SMITH JUNE 2023

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Above: The SIG Sauer P210 is generally similar to the original SIG P49 and P210 pistols but the internal design has been modified and upgraded in many cases. The controls are 1911-like and have generous lever surfaces. Take down is extremely simple, and the slide stop spring is no longer riveted to the frame.

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Above: The SIG Sauer P210 is generally similar to the original SIG P49 and P210 pistols but the internal design has been modified and upgraded in many cases. The controls are 1911-like and have generous lever surfaces. Take down is extremely simple, and the slide stop spring is no longer riveted to the frame.

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Right: Use the "Glock grasp" to align the slide stop notches in the slide and frame for removal or installation of the slide stop. The slide is held to the rear by about 1/4" for the notches to align.

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Working the US-made SIG P210A models. by Brian R Smith This isn't your Swiss police or German borderguard P210. The American-made P210A in Standard, Target, and Carry is different in design details, much improved ergonomically, and is every bit as accurate as its Swissmade predecessor.

Chick Blood (RIP, I really miss his contributions and sense of humor) did apiece on the originalstyle P210-6 several years ago ("Disassembly and Reassembly of the Sigarms P210-6", August 2005) but it is vastly different from the current P210A models designed and built by SIG Sauer in the United States.

This article covers primarily the Standard and Carry models, touches on the Target model's features, contrasts the differences between the original P210 and the P210A, and includes detailed takedown instructions and assembly tips. Here's how I came to work on one. "Something's missing," the customer said, handing me a box with the slide and frame with which to assemble a SIG Sauer P210A Standard, except one. "I can't get it back together." He was correct.

The recoil spring on the Americanmade P210 is a captured assembly together with the guide rod, and both components were in the box but disassembled. The rear of the guide rod has along loop that surrounds the slide stop shaft. Looking at the front of the guide rod it was clear that the screw normally holding the bushing and spring fast to the guide rod was indeed not present. In fact, the small-diameter screw shaft had fractured.

A quick attempt to reinstall the guide rod and recoil spring into the slide failed because the inside diameter of the bushing at the front The controls are 1911-like and have generous lever surfaces. Take down is extremely simple, and the slide stop spring is no longer riveted to the frame. of the guide rod is a close fit to the outside diameter of the guide rod and the inside diameter of the recess in the slide beneath the barrel port at the muzzle.

With recoil spring force holding it in place in its recess in the front of the slide, the spring and guide rod did not allow enough off-axis flex for the guide rod to enter the bushing so that the guide rod loop could be inserted in the barrel lug.

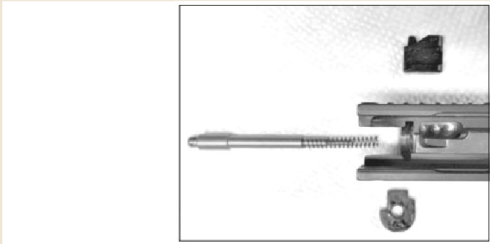
Omitting the bushing, the guide rod and flat wire spring could be wrangled into place using three hands, but then the clearance between the outside diameter of the guide rod and the inside diameter of the guide rod clearance hole in the front of the slide was excessive, not unlike a broomstick in a bathtub. No way I'd fire the P210A with the guide rod banging around inside its hole in the slide with each shot.

Fortunately, the customer was the original purchaser and the The slide is held to the rear by about 1/4" for the notches to align. SIG warranty covers defects in materials or workmanship to the original owner. It was time to see if SIG would walk the fine print and they did; less then two weeks after contacting SIG Sauer Customer Service a warranty-replacement recoil spring and guide rod for the Standard model was delivered (part number 3600126R).

Those two weeks presented the opportunity to do a complete tear down (with the customer's permission) of his SIG P210A Standard. History The P210 model has evolved since its invention by Swiss-born Charles

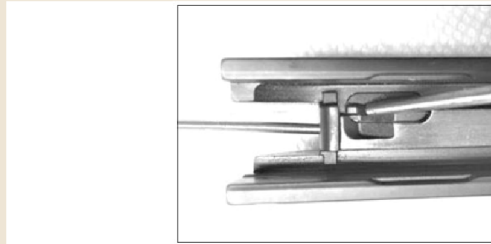
SIG P210A CONTINUED

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Far left: The punch on the right is pushing the firing pin safety lever to the rear of the slide, allowing the firing pin to be depressed with the punch on the left so that the 1911-style slide plate can be removed. Left: Once the slide plate is removed (bottom), the firing pin and its spring are withdrawn to the rear (at left) and the firing pin safety (at top) can be lifted out of its oval recess in the slide using forceps or tweezers.

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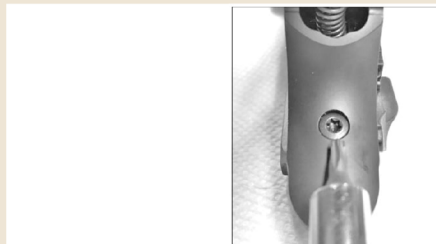
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Far left: There are three screws in a P210A Standard, Target, or Carry: grip screw, safety lever stop screw, and fire control group housing retention screw (shown). Conveniently, all use a T15 driver bit. Left: The P210A makes use of an "en bloc" fire control group similar to that of the TT33 Tokarev and the original P49/P210 but is not interchangeable with the FCG of the earlier SIGs. Note the T15 flat headed screw under the safety lever; its sole purpose is to limit the safety's downward travel.

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Gabriel Petter when he was working for Schweizerische Industrie Gesellschaft (SIG) in the late 1940s. The pistol is based on Petter's earlier invention, the French M1935A produced by Société Alsacienne de Constructions Mécaniques (Alsatian Corporation of Mechanical Engineering, or SACM) while he was director of that firm prior to World War II. The SIG pistol was adopted by the Swiss military as the P49, replacing the Swiss pattern Luger as its sidearm.

The Swiss police adopted it shortly thereafter as the P210, as did the Danish police and West German Border Police. The various original P210 models were identified by numerical suffixes throughout production until the line was shut down in the mid-2000s. The original P210 has always been synonymous with dependability and phenomenal accuracy. The requirement was that the P210 must exhibit accuracy of 50 mm groups (2 inches) at 50 meters (164 ft).

That may seem outside the capability of most handgunners, but the pistols delivered. P210s were also synonymous with high prices. Current sale prices for original P210 models, be they Swiss, Danish, or German range from the high \$2,000 to over \$5,000 for scarce, rare, or unique variants. SIG Sauer, the American arm of the firm, saw an opportunity and decided to modify the German-made SIG P210 Super Target to create the SIG Sauer P210A in Standard, Target, and more recently, Carry models.

The Standard and Target were introduced in 2016 to generally favorable reception, but of course some claimed that SIG Sauer ruined the original P210. Personally, I don't share that critical opinion. While at first glance the P210A Standard superficially appears to be identical to original P210 of the late 1940s, it is not. A closer look shows that the P210 Standard's safety lever is located at the rear Far of the receiver not unlike that of a 1911.

The original P210's safety is at the upper left of the left grip panel, at the location of and resembling the de-cocker lever on a SIG P220, P225, P226, P228, etc. The P210 Standard employs an "American" magazine release button located near the trigger guard, in contrast to the original's heel-located magazine release. The slide stop is in the usual location, but both the slide stop and safety levers are extended for increased leverage and ease of actuation.

They are reminiscent of custom aftermarket 1911 controls and make for excellent thumb support while shooting. The P210A Standard and Target model grips are checkered walnut and are held in place by a bevel in the forward edge of the grip panels engaging a beveled forward edge in the magazine well window and by a T15 drive screw from the left Far Conveniently, all use a T15 driver bit.

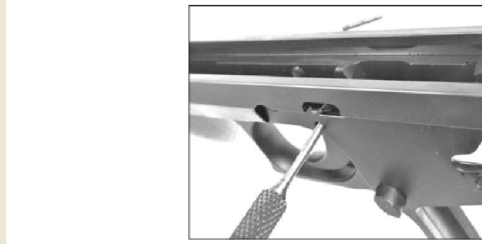
SIG P210A CONTINUED

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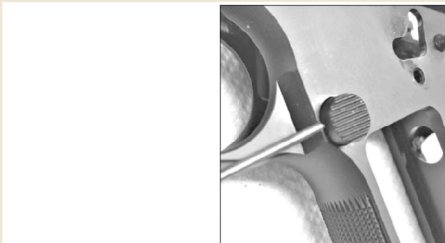
Far left: Removal of the trigger axis pin is conventional and simple; just tap it out with a small punch. It is retained by a small P-shaped wire spring that rests in a groove in the center of the pin. That spring co-retained in the top of the trigger by the trigger axis pin, so be mindful of it during disassembly. Left: The trigger assembly is withdrawn from the frame upward and to the rear at an angle as shown; the short 90 degree end of the trigger axis pin retaining spring is just visible in the notch at the top of the trigger.

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Far left: Removal of the trigger axis pin is conventional and simple; just tap it out with a small punch. It is retained by a small P-shaped wire spring that rests in a groove in the center of the pin. That spring co-retained in the top of the trigger by the trigger axis pin, so be mindful of it during disassembly. Left: The trigger assembly is withdrawn from the frame upward and to the rear at an angle as shown; the short 90 degree end of the trigger axis pin retaining spring is just visible in the notch at the top of the trigger.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED



Far left: Use a paperclip to remove a paperclip. The black oval wireform at left is the slide stop spring, which is removed by levering it out of its slot in the frame by using a thin tool. Shown at right is a Universal Gunsmithing Tool, a.k.a. an unfolded small paper clip. Left: The punch points to the spring-loaded magazine release button retainer. Depressing the retainer and holding it depressed unhooks the retainer from the frame and allows the button and retainer to be removed to the left out of the frame. Mind the retainer coil spring and control the retainer when removing the punch to prevent a launch.

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ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

panel engaging a threaded bushing in the right. The P210A omits the characteristic lanyard loop at the lower rear of the original P210's left grip panel. The P210A Standard magazine floor plate is angled to ensure support for the little finger on the shooter's strong hand.

The P210 Standard's magazine is the same as that used in the P210 Carry model, and the magazine body and internals are the same as those used in the P210A Target, but the Target magazine has a longer, more rectangular plastic floorplate to extend below the longer Target grips.

Internally, there are many details that differ between the original and the P210A; the significant ones include: The original P210's barrel and receiver were lugged in the manner of a 1911, but the P210A makes use of the barrel's chamber block mating with the ejection port like that of classic SIG P-series pistols, Glockes, and other modern handguns. The original P210 uses a straight slide stop spring that's riveted to the frame and is not readily serviceable.

The P210A's slide stop spring resembles a paper clip and can be "flicked" out of its channel in maybe 2-3 seconds. Both the original and the P210A employ "en bloc" fire control group housings which are similar but not interchangeable. Disassembly An exploded diagram of the P210A's parts is not in the owner's manual and SIG Sauer was not amenable to providing one when contacted, so I regret that such diagram does not accompany this article.

However, take down is essentially like that of a Browning High Power or a 1911, and I have attempted to use generic and long-accepted terms for parts. First and as always, remove the magazine and rack the slide to verify that no round is in the chamber. Using the "Glock grasp," pull the slide to the rear about 1/4" so that the cutout in the slide aligns with the upper tip of the slide stop.

Push on the slide stop shaft from the right side to start it out, then Far It is retained by a small P-shaped wire spring that rests in a groove in the center of the pin. That spring co-retained in the top of the trigger by the trigger axis pin, so be mindful

of it during disassembly. grasp the slide stop lever with fingers to withdraw it. The slide can be pushed forward and off the frame at this point.

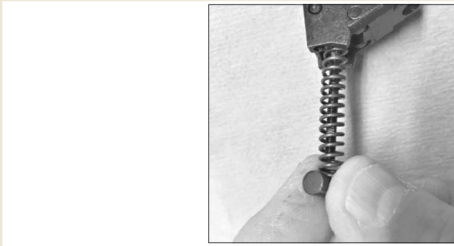
As previously mentioned, the recoil spring and guide rod is a unitized assembly and removed by dislodging the looped head of the guide rod from the front of the barrel lug, tilting down, and withdrawing it to the rear. The barrel's chamber block is lifted out of mesh with the ejection port in the slide and removed from the slide as with any other tilting-barrel handgun.

The firing pin is removed by locating the firing pin safety assembly which at first glance appears to Far The black oval wireform at left is the slide stop spring, which is removed by levering it out of its slot in the frame by using a thin tool. Shown at right is a Universal Gunsmithing Tool, a.k.a. an unfolded small paper clip. Depressing the retainer and holding it depressed unhooks the retainer from the frame and allows the button and retainer to be removed to the left out of the frame.

Mind the retainer coil spring and control the retainer when removing the punch to prevent a launch.

SIG P210A CONTINUED

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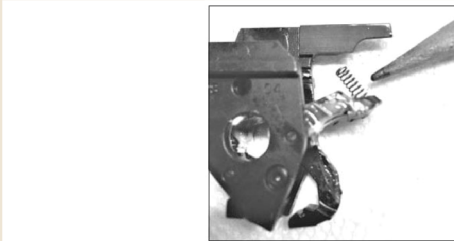
Far left: It is recommended to put a dab of paint on one end of the cylindrical “nut” that retains the hammer spring on the threaded hammer strut. This makes it easy to count the revolutions of the nut while removing or installing it on the hammer strut. Regarding the article guns, the P210 Standard’s nut was screwed on seven turns, and the Carry model’s nut was on ten turns. Left: After removing the hammer spring nut, tap out the hammer axis pin to remove the hammer (pin shown on the side of the fire control group housing).

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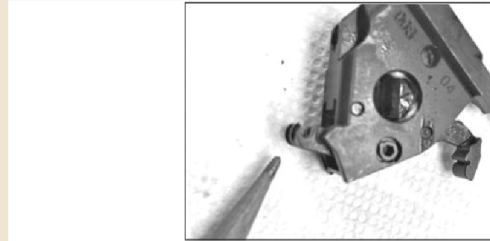
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threaded portion of the hammer strut catches on the slot in the upper hammer spring seat. Pushing the hammer and strut back into the FCG housing generally dislodges the upper spring seat for removal. Then remove the hammer and strut. Left: The sear lever is shown pivoted 90 degrees to the right on its axis pin to show the location of the sear spring. The sear lever is removed by drifting out the sear axis pin.

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threaded portion of the hammer strut catches on the slot in the upper hammer spring seat. Pushing the hammer and strut back into the FCG housing generally dislodges the upper spring seat for removal. Then remove the hammer and strut. Left: The sear lever is shown pivoted 90 degrees to the right on its axis pin to show the location of the sear spring. The sear lever is removed by drifting out the sear axis pin.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED

be a oval-shaped firing pin block on the right underside of the slide. There’s a tiny lever in the firing pin safety that must be pushed to the rear in order to move the firing pin itself forward using a punch in order to remove the slide plate. Once the slide plate is removed, restrain the firing pin and lift out the firing pin safety assembly with forceps or large tweezers. Release the firing pin and its spring in a controlled manner to prevent its launch.

The extractor is of the external type, pivoting about a vertical pin in the frame and driven with force applied by a coil spring seated crosswise in the slide and acting on the extractor’s rear end. Control the extractor and drive out its pivot pin to remove extractor and spring. The front and rear sights are removable by drifting them to the right in their respective dovetails, if necessary.

Restrain the hammer and pull the trigger while allowing the hammer to gently pivot forward and unloading the hammer spring in the process. Remove the grips using the T15 drive bit, then tilt the grip panels out at the back, using their forward

edges as “hinges” where they clip under the front edge of the mag well windows on each side. Next, use the T15 bit to remove the screw under the beavertail so that the Tokarev TT33-like fire control assembly can be lifted out from the top of the slide.

Once more using the T15 driver, remove the flat headed screw that’s immediately beneath the safety lever. The sole purpose of this screw is to limit downward travel of the safety lever. Then lift out the slide lever to the left. Locate and drive out the trigger pin from the frame to either the left or right. Beware of a tiny open P-shaped wire spring in the top of the trigger; its job is to retain the trigger axis pin just removed, similar to the setup for an AR-15 hammer and its axis pin.

The SIG P210 Standard’s trigger axis pin retaining spring is not captive, so it Far This makes it easy to count the revolutions of the nut while removing or installing it on the hammer strut. Regarding the article guns, the P210 Standard’s nut was screwed on seven turns, and the Carry model’s nut was on

ten turns. may fall out of its slot in the top of the trigger. Reassembly tip: Use a dab of grease to retain this spring in the trigger.

The short end of the spring points to the left and resides in the slot at the top of the trigger. With awareness of this spring, the trigger assembly can be withdrawn in a slanted direction up and to the rear and out of the frame. The trigger stirrup is held to the trigger by a pin; if the work demands it, drive out this pin to separate the components.

Be mindful of the coil trigger reset spring that’s housed in Far The rear end of the upper spring seat rests on an FCG housing crossmember, and the hooks at the front end rest on a crosspin. If you try to pull the hammer up and out of the FCG housing, the threaded portion of the hammer strut catches on the slot in the upper hammer spring seat. Pushing the hammer and strut back into the FCG housing generally dislodges the upper spring seat for removal. Then remove the hammer and strut.

The sear lever is removed by drifting out the sear axis pin.

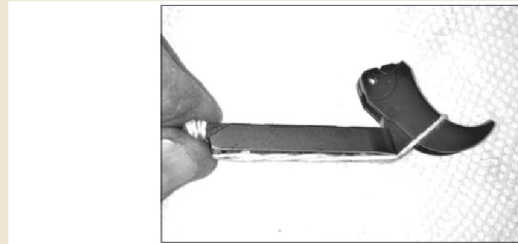
SIG P210A CONTINUED

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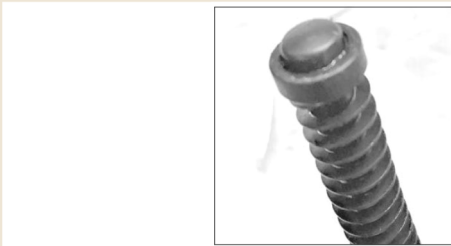
Far left: The open P-shaped trigger pin retention spring is indicated by No 2; the trigger pin retention spring is shown in its correct position as if inserted into the top of the trigger. The long leg of the tiny spring ends in a 90 degree bend, which is seated in the square slot at the top of the trigger when correctly installed. The ~ 45 degree bend in the long leg seats in the groove in the trigger axis pin, and is just visible at the 7-8 o'clock position in the trigger axis pin hole through the trigger itself. During reassembly retain the spring with a dab of grease. Above: Nifty reassembly hint. Use thread or a string from a tag to hold the trigger and stirrup in the position shown, with an imaginary tangent line at the bottom edge of the trigger approximately in line with the bottom edge of the stirrup as shown. This keeps the tab on the stirrup in proper engagement with the end of the trigger reset spring during assembly, otherwise the tab on the stirrup will crush into the side of the reset spring. Once installed in the frame, unwrap the string from the sear engagement block at the rear of the stirrup and pull it out.

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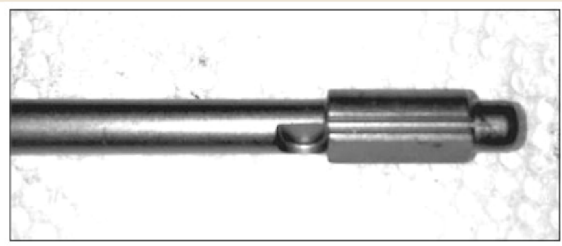
Right: Another reassembly hint. The flats and notch at the rear of the firing pin must be aligned with the firing pin safety assembly in order for the firing pin and spring to be reinstalled.

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Below: The forward end of the replacement recoil spring assembly showing the cap-like screw head that retains the recoils spring on the guide rod. The cap-like screw head was missing from the customer's P210 Standard. The recoil assembly is part number 3600126R.

ORIGINAL ARCHIVE IMAGE · PERMISSION CONFIRMED



Below: The forward end of the replacement recoil spring assembly showing the cap-like screw head that retains the recoils spring on the guide rod. The cap-like screw head was missing from the customer's P210 Standard. The recoil assembly is part number 3600126R.

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Far The long leg of the tiny spring ends in a 90 degree bend, which is seated in the square slot at the top of the trigger when correctly installed. The ~ 45 degree bend in the long leg seats in the groove in the trigger axis pin, and is just visible at the 7-8 o'clock position in the trigger axis pin hole through the trigger itself. During reassembly retain the spring with a dab of grease.

Use thread or a string from a tag to hold the trigger and stirrup in the position shown, with an imaginary tangent line at the bottom edge of the trigger approximately in line with the bottom edge of the stirrup as shown. This keeps the tab on the stirrup in proper engagement with the end of the trigger reset spring during assembly, otherwise the tab on the stirrup will crush into the side of the reset spring.

Once installed in the frame, unwrap the string from the sear engagement block at the rear of the stirrup and pull it out. The upper part of the trigger. This reset spring works against a tab projecting at the forward end of the stirrup, and if the stirrup is rotated down and toward the trigger that tab will

crush into the side of the trigger reset spring, a consideration for reassembly which is dealt with later in this article.

If it is necessary to remove the magazine release, use a small punch to depress a spring-loaded plunger in the forward-facing area of the mag release button while pulling the button forward and out of the frame. The frame itself is now stripped. To disassemble the fire control assembly, first clean off one end of the cylindrical hammer spring nut with acetone or another such solvent degreaser and apply a dab of paint to provide indication of the number of rotations as you unscrew the nut.

As a point of reference, on my customer's P210 the nut was screwed on seven full turns. The nut on another customer's P210 Carry was on ten full turns; YMMV. The trigger pull and hammer force on the firing pin can be adjusted within a narrow range by The flats and notch at the rear of the firing pin must be aligned with the firing pin safety assembly in order for the firing pin and spring to be reinstalled. increasing or decreasing the number of turns the nut is screwed on.

If the nut is screwed on too far, the hammer spring will be compressed coil-to-coil before the sear surfaces engage. If the hammer spring is not compressed sufficiently, the blow struck by the hammer on the firing pin will be insufficient to set off primers, and there may be insufficient force to keep the sear surfaces engaged when the pistol is cocked, and it may unsafely discharge if bumped, jarred, or as the safety is moved to the "fire" position.

It is recommended to perform a basic safety and fire control group (FCG) function check upon re-assembly of the pistol. Once the cylindrical nut is off the threaded hammer strut, remove the hammer spring. Drive out the hammer pin from right to left. The hammer and strut can be lifted upward and out of the fire control group housing, but the larger-diameter threaded lower section of the hammer strut will catch on the slot in the upper hammer spring seat.

Pushing back down on the hammer and strut usually loosens the upper hammer spring seat from the The cap-like screw head was missing from the customer's P210 Standard. The recoil assembly is part number 3600126R.

SIG P210A CONTINUED

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Left: A comparison of the P210 Carry barrel and recoil spring assembly (top) with that of the P210 Standard and Target models (bottom). The Carry uses a non-captured flat wire spring and the rectangular rear end of the guide rod abuts the front of the barrel lug. A circular flange on the guide rod supports the rear end of the recoil spring. The Standard and Target models employ the captured flat wire spring discussed in the article. The two recoil assemblies are not interchangeable.

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The Carry uses a non-captured flat wire spring and the rectangular rear end of the guide rod abuts the front of the barrel lug. A circular flange on the guide rod supports the rear end of the recoil spring. The Standard and Target models employ the captured flat wire spring discussed in the article. The two recoil assemblies are not interchangeable. bottom of the FCG housing where it can be slid forward and off the hammer strut. Now remove the hammer and strut upward and out of the FCG housing.

To remove the sear lever, drive out the sear pin from right to left and remove the sear lever and its coil spring from the rear of the FCG housing. There are two other pins in the FCG housing that serve to hold the two housing side plates in an assembly (much like the pins in a Marlin 60 or Sterling Mk IV submachine gun fire control group) and these are not removed. The P210A is now fully disassembled. P210 Differences Some notes on the differences between the P210 Standard, Target, and Carry models.

All three models use the same frame. The Standard and Target models feature different grips, the Target model's slide has forward serrations, and the Target model has the adjustable rear sight. The sights on the Standard are white three-dot, and the Carry sight are tritium three-dot night sights. The Carry model

has a shorter slide which provides the Carry with almost identical overall dimensions as those of a Commander-style 1911.

The Carry uses a flat wire spring separate from the guide rod, which itself does not have the long loop of the Standard and Target models that inserts into the barrel lug. Rather, the Carry's guide rod ends in a rectangular block that abuts the front face of the barrel lug. Consequently, the lug of the Carry model's barrel differs from that of the Standard and Target model barrels.

The magazines are the same for the Standard and Carry, but the Target model magazines have longer floorplate extensions with less taper to fit the contour of the extended Target grips. The take away: The Carry model's slide, barrel, and recoil assembly does not interchange with those of the Standard or Target. Reassembly For reassembly, there are a few key points of which to be aware. Remember to screw the hammer strut nut back on the same number of turns as it required to remove the nut.

The hammer spring is not so stiff that it can't be partially compressed and held with the thumb and forefinger of the opposite hand. Clamping the FCG housing between protected jaws of a small bench vise is helpful as a "third hand" for reassembly.

As mentioned previously, the trigger reset spring in the upper body of the trigger acts on a short The P210 Standard and Target grips are retained



Left: The Carry model's Hogue-made G10 grips are retained by a T15 Torx screw with a U-shaped washer under the screw head and a U-shaped nut on the right grip panel recess. The P210 Standard and Target grips are retained by a T15 Torx screw that threads into a standard serrated-OD threaded bushing pressed into the wood.

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by a T15 Torx screw that threads into a standard serrated-OD threaded bushing pressed into the wood. projection at the front of the trigger stirrup. The reset spring must be pre-compressed with a punch or small screwdriver before the stirrup is swung up into position, or else the projection crushes the reset spring at its center.

I used the thin string from a string-type price tag looped around the trigger surface and back, wrapping around the sear trip at the rear of the stirrup. The tag string was sufficiently thin that it did not bind between trigger assembly and the slot in the frame during reassembly, but sewing thread can also be used. You have to adjust the string or thread so that the trigger is tilted up at the lower end slightly in order for the trigger to line up with the slot in the frame (see photo).

Also previously mentioned, remember to use a dab of grease to retain the trigger pin retaining spring in the top of the trigger when reassembling. The safety lever must be in place in the frame prior to re-insertion of the FCG housing, which retains the safety lever. The oval firing pin safety assembly must be reinstalled in the slide before the firing pin and with the tiny lever toward the rear of the slide.

The rear of the firing pin has flats machined for the firing pin safety assembly, and these must be rotationally aligned with the firing pin safety assembly during re-installation. The tiny lever in the firing pin safety must be pushed to the rear to allow the firing pin to

SIG P210A CONTINUED

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Left: Ignoring distortion from the camera wide-angle lens, the P210 Standard (and Target) frame (top) is identical to that of the P210 Carry (bottom).
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enter the slide and clear the firing pin safety. Once the firing pin in is the slide, use a small diameter punch to push it forward to allow the slide plate to be reinstalled, just as if reassembling a Browning High Power or 1911. When lining up the slide and frame for insertion of the slide stop shaft through the barrel lug (and guide rod loop in the Standard and Target models), it helps to eyeball the hole in the frame and the barrel lug to ensure their alignment.

Insert the slide stop shaft partially and taking care that the lug on the inside rear of the slide stop lever clears the outside wall of the frame, rotate the slide stop lever up and into position and then push it toward the frame and into its slots in both frame and slide. This avoids putting an “idiot scratch” arcshaped mark in the slide finish.

SIG Sauer is very much like Ruger in that they want firearms returned to the factory for most service, presumably for both liability and revenue-generation reasons, the latter when warranty claims are not indicated. You may still see these new P210 models land on your entry countertop.

Although the SIG P210A in its three incarnations is a superbly accurate and reliable pistol out of the box, it's not to say that polishing the usual surfaces wouldn't hurt things and some customer may want something fluffed and buffed. Also, it helps to know one's way around these handguns in the event one shows up in bits in a cardboard box.

While awaiting the P210 Standard's replacement recoil spring and guide rod assembly from SIG Sauer, the P210 Carry seen in the accompanying

photos that found its way to my bench had a problem of sorts in that the slide hung up as the barrel block would cam up into the ejection port in the slide. That its owner was a “slide rider” and not a “sling shotter” was the larger part of the problem, because the Carry model's slide went right into battery when I “sling shot” the slide every time.

When I rode the slide closed, it did encounter resistance when the barrel started camming up into the ejection port; this was not present in the P210 Standard. Regardless, the customer either read a review article or watched a video on a SIG P210 Carry someplace on the Interwebz where the writer/presenter mentioned the slide not going into battery without a “bump” if gently moved forward, instead of allowing the slide to snap into battery under recoil spring force.

My customer took that to mean that the slide on his Carry was to be gently let forward when chambering around or simply putting the slide into battery (those darned Interwebz gun “experts”). Since the P210 Standard did not exhibit this same resistance, I went ahead with adjustments to the Carry. Applying some indicator fluid and cycling the slide (minus the recoil spring assembly) quickly put light on the surfaces responsible for the Carry model's slide being tight while going into battery.

I broke out the fine ceramic stones for that work and literally made one pass at a time on the surfaces on the barrel “block” over the chamber, reassembling the slide to frame with a partially-inserted slide stop shaft between passes of the ceramic stone. The Carry slide was left with the briefest of hesitations before snapping fully home

if I rode the slide forward, telling the customer that he didn't want the pistol worn out following his shooting only one box of 50 rounds and my light adjustments.

He was happy; his fears of the slide failing to go shut in a crisis moment were averted, and he was set straight on slingshotting the slide. “After all,” I told him, “the slide is snapping forward and into battery using full compressed recoil spring force when being fired, innit?” He had a blank stare at first, but you could see the LED light up as he realized what I was getting at.

Having both the Standard and Carry models allowed me the opportunity to test drive both, and I put a couple-few magazines full of 115 grain generic 9mm Luger ammo through each. Seldom have I fired handguns that delivered one-inch groups at 50 feet off a sandbag rest out of the box, but both of the P210As did.

The creepless two-stage light trigger pulls in the 3.5 (Standard) to 4.2 (Carry) pound range plus the ball-bearing-like full-rail slide to frame fit and self-lubricious nitride finish no doubt contribute much to the phenomenal accuracy of these fine pistols. Some may complain that the magazine capacity is comparatively small at eight rounds when compared to other modern pistols, but with the inherent accuracy of the P210A the extra rounds may not be required.

The late Colonel Townsend Whelen is known for stating, “Only accurate rifles are interesting.” Extending that philosophy to handguns, the SIG Sauer P210A in its incarnations are very interesting handguns indeed. AG

MAINTENANCE & REPAIR

Gunsmithing Adhesives

A synopsis of learning about and using adhesives. Here's what I've learned about different products and surface preparation over the past 65 years.

BY CHARLIE BRIGGS JUNE 2023

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I was first introduced to epoxies about 1957 and thought they were the best thing since sliced bread. I used them to try and fix everything, from a broken bed frame and a broken exercise bike, to even damaged ski boots... and more! Well, they were better than most “glues” of the day and were waterproof as well. And, of course, some of these projects were successful, but many were not. Most of the problems were probably due to improper or general lack of surface preparation, which I still had to learn about.

About nine years later, an off-the-wall experience gave me a something akin to a “bachelor’s degree” in surface preparation! Note, this was decades before high grade cyanoacrylate adhesives (popularly known as “super glue”) were available. More about them later. Back in 1966 at a cocktail party near Pittsburgh, the home of the Alcoa Corporation, I happened to strike up a conversation with a scientist with that aluminum giant.

At the time, I had a 375 horsepower (which was a lot in those days!) '63 Corvette with a leaky aluminum radiator. I explained to my new drinking buddy how I couldn't find a radiator shop anywhere that would work on it because, unlike most cars which had conventional brass or copper radiators that could be soldered, mine was aluminum. Replacing it would have been pretty pricey and I was interested in any viable alternative.

To my good fortune, he was excited about this as his boss had been pushing Chevrolet to switch to aluminum radiators for all their models but the company was resisting due to an

“insufficient” amount of real-world testing and real-world repairs. He insisted that I bring my Corvette into his laboratory at a nearby Alcoa facility, pronto! The next morning I visited Alcoa where two white-coated, \$100,000-per-year scientist/mechanics pulled out my radiator and taught me how to epoxy aluminum components.

First, they pressure washed the radiator and then filled it with water under pressure to find the leak. Next, they wire brushed the area around the leak and then etched it with hydrochloric acid. Following this, they scrubbed the area again with distilled water to remove any trace of acid, dried it with a heat gun, and washed the area again, this time with a solvent like carbon tetrachloride (“carbon tet” as it was known then, which was a great product but is no longer available today, due to dangerous fumes.

More about that later). Drying the radiator again, they applied an epoxy mix over the leak, put the radiator into a warm (about 90 degree) oven, and we went out to lunch. They wouldn't let me pay for any of their work, but they did let me buy lunch. After along lunch the epoxy had cured, so they pressure tested it again. Success! Then they reinstalled the radiator and attached a metal tag with their phone number, saying that anyone working on the radiator again should call the laboratory.

I sold the car years later, but don't think anyone ever had to call the lab. I know I didn't! That experience at Alcoa helped me again eight years later. I was a crew chief for a small sports car racing team running a Datsun 240/260 Z.

We were having a great weekend, qualifying second overall against some big names. However, just hours before the actual race, I noticed a small oil leak coming from a hairline crack in the aluminum transmission case.

We had no spare and obviously had no time to locate and install a replacement gearbox. Having no other choice, I grabbed some J-B Weld epoxy from a toolbox, plus my old faithful (and still available) carbon tet. With a 1/32" drill bit I slightly enlarged and roughened the crack for more surface area, wire-brushed it with probably a pint of carbon tet, then forced the J-B Weld into the crack with a flat blade screwdriver.

With our fingers crossed, the epoxy was probably still curing when we pushed our race car onto the starting grid. Fortunately it was a warm summer day. How'd we do? We won some money after finishing in second place and had no leaks, which was critical as leaking oil on a race track will get you disqualified in a heartbeat! Here's a more extreme case.

About 1980, my stepson, driving without permission, somehow managed to get my wife's turbocharged, grey-market BMW 745 airborne, landing with the oil pan and intercooler on a large boulder! A friend of mine with a tow truck got it off the boulder just before the police arrived. While there was no apparent damage to the boulder, things didn't work out so well for the cooling system as it turned out. On the way home, it overheated, of course, and blew the head gasket.

Far The grooves in the outsides of the pillars virtually double the surface area, adding significantly to the strength of the bond. The inside and top of the pillars, as well as the action and screws, have all been coated with mold release; part of the scheme to avoid permanently bonding the stock to the receiver or even the stock bolts. Ordinary children's modeling clay from Walmart and masking tape are used to keep excess Acra Glas from intruding where we don't want it.

Again, a good mold release is applied to the top and insides of the recoil lug itself, as well as the front assembly bolt. The modeling clay is easily removed after the Acra Glas hardens. Anew gasket would have required removing the cylinder head, timing chain, water pump, intake and exhaust manifolds, the intercooler and the turbo. This would have been about \$6,000 in labor in 1980 dollars. No, I couldn't afford it.

So, with nothing to lose, I scraped around the existing gasket junction with a screwdriver, wire brush, and lots of carbon tet. Once it dried, I forced J-B Weld into the crack and let it cure. The next morning, I refilled the "bimmer" with antifreeze and water. (Bimmer? Yep. A little known fact: According to the BMW Club of North America, "bimmer" is slang for a BMW car while a "beemer" is a BMW motorcycle.) I had a friend of a friend TIG weld the intercooler as that was too damaged to repair with the epoxy.

Even after a number of years later, and despite thousands of miles with all the associated heat, vibration, and turbo pressure, the gasket never leaked! The above anecdotes weren't about guns, obviously, and this is a gun magazine. Yes, I, Les Baer, and probably many of you, enjoy fast cars as well as guns.

Like RK Campbell's "Stuck Parts And Extreme Measures" article in the June 2022 issue showed, many of us learned welding, machine work, spring making, adhesives, etc. from other trades and sometimes before getting into gunsmithing. So now, here's the gunsmithing side of this: Until something I think is better comes along, my go-to adhesive for pillar bedding and glass bedding rifles is Acra Glas Gel, the epoxy from Brownells listed as number 081-014-007.

This can be stained and various shades I'm showing it front and rear to prove its age; note the number of members are about half of today's membership number. Shortly after I bought it, the hook in the buckle that snaps into the holes in the belt broke off flush. I drilled out the base of brown or black, and where necessary strengthened with atomized steel. What I like most about Acra Glas is that as a gel it doesn't sag or run; it just stays where you want it then hardens predictably.

Once hardened, instead of becoming brittle like some of the others, it can "give" just enough to avoid breaking due to age while under recoil and other stresses incurred by firearms. When working with adhesives it's important to note three important points: Surface Preparation, Surface Preparation, and Surface Preparation!

Here's the part about carbon tet: All surfaces must be clean and dry with zero traces of oil, including the oil off of your skin! of the broken hook, just partially through the buckle, thoroughly prepared the surfaces, and used J-B Weld to "glue" in a small sheet metal screw as a replacement for the hook. Before the epoxy cured, I added a small washer over the screw to enlarge the surface area. I'm still wearing the belt, 43 years later, and that's with a "little" extra tension in my beltline!

GUNSMITHING ADHESIVES CONTINUED

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Notice, with pillar bedding I've skipped the acid-etching for fear of damage to the action but I still clean the heck out of the pillars, assembly screws, and action with a good brake cleaner available at most any auto parts store. In my opinion, this is as good as carbon tet but without the associated EPA problems. Of course, remember to next use a good mold-release on the screws, the tops and insides of the pillars, contact points of the action, etc. to avoid epoxying the whole rifle together!

Brownells now offers two versions of mold release: # 081-028-000 and # 081-007-004. I've also tried Dev-Con and Marine-Tex epoxies; both are good, but for our purposes, I still recommend J-B Weld and/ or Acra Glas where appropriate. Note, in my article "AR-15 Recoil Pad" (March 2021) I also used J-B Weld where I had to fill a "honeycombed" portion of a buttplate on a 450 Bushmaster AR-15 so I could drill and tap it in order to attach a recoil pad.

And, where heat might be an issue, J-B Weld is already steel-impregnated and can handle heat better than any other epoxy I'm familiar with. Always, as with any two-part adhesive, measure your portions carefully and blend them carefully. Stir thoroughly but don't whip the mixture lest you incorporate air into the mix, which will weaken it. Incidentally, for

something great in which to mix your epoxies, see if you have a Gordon Food Service (GFS) store in your neck of the woods.

They're basically a restaurant supply, yet open to the public. They're a fun place to visit and while there, I found a bag of little half-ounce plastic cups, 100 for about \$3.00. They're probably made for salad dressings, catsup, or whatever, but they're perfect for mixing gunsmith-sized portions of epoxy! Lastly for epoxies, there will be times that you have an odd-shaped piece of metal that you need to machine but is tough to clamp.

For those situations I choose a lowcost "five minute" epoxy from Ace Hardware or Harbor Freight. Use it to epoxy the darn thing to a piece of aluminum or steel scrap you can conveniently clamp in the mill vise or lathe chuck. Once the epoxy cures, clamp it and machine where you need to. Afterward, a little heat with a heat gun or propane torch will allow you to separate them when you're finished. Earlier, I mentioned cyanoacrylate adhesives.

There may be some job where they can help, like maybe an irreplaceable cracked plastic trigger guard, revolver stock, or butt plate, however, a recent development called Black Max from Loctite is a whole 'nother animal! It's a proprietary formula combining a cyanoacrylate with rubber. Black Max may be a little hard to find and it's a little pricey, but it's

amazing for the right application. It's great for attaching and repairing shotgun sights, sight ramps, and vent ribs and beads.

I also use it when replacing screwon front sights on heavy-recoiling handguns like .45 caliber or 10mm Glocks. With proper surface preparation, its hold is more or less permanent, yet the rubber in it absorbs shock. Since it's already black, it hides the tiniest gaps, like just under the rear of the front sight. Lastly, here's an unexpected one, but to my knowledge, nothing else compares to it for certain jobs. Shoe Goo as available at Ace Hardware or elsewhere is amazing!

It's tougher than two-for-a-nickel toilet paper and it stays flexible. In fact, it's almost as strong as J-B Weld but it adheres better to plastics and rubber compounds. Available in clear or black, the black version of the product is the answer where older black recoil pads start to delaminate or get torn. Put it where it's needed, then clamp everything together appropriately. About 12 hours later, sand the edges lightly as otherwise it will dry and glossy, exposing itself.

Of course, as the name implies, it also fixes damaged shoes of all kinds. That's it for now. Hope I've been some help to the fraternity. For any questions or comments, please email me at CBgunsmith@verizon.net. AG

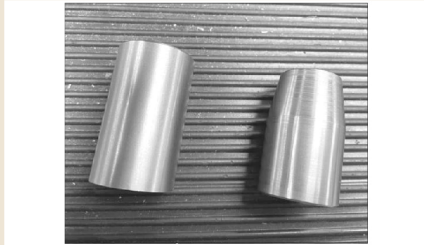
RIFLES

Custom Muzzle Brakes

Give me a brake! Here's how I outlined the design and manufacture of a custom muzzle brake.

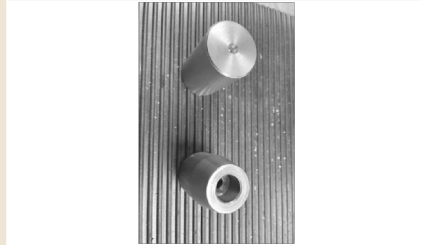
BY ROBERT M. LAYNG JUNE 2023

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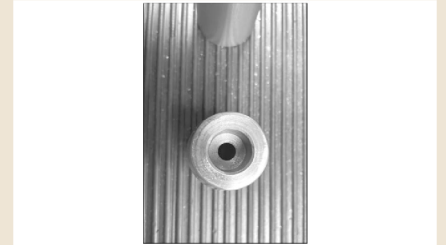
Right: Top view of the original size blank machined from stainless steel bar stock (left) and the outside contours completed, with included taper (right).

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Far left: Side view of the original machined blank (top) and the finished outside contours with bore drilled and threaded hole roughed (bottom). Left: A better top view of the contoured blank with bore drilled and threaded hole roughed out.

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Far left: Side view of the original machined blank (top) and the finished outside contours with bore drilled and threaded hole roughed (bottom). Left: A better top view of the contoured blank with bore drilled and threaded hole roughed out.

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Recently, while completing a custom rifle build (which you may have seen in recent pages of this very magazine), I made the decision to install a muzzle brake on the rifle. Some of you more observant readers may have noticed that I had photos of a brake I previously made in my recent article, but it ended up being a massive boat anchor. It was too heavy and I felt it could be a detriment to accuracy if I used it.

After weeks of perusing the Web and poring over the plethora of options, I could not find one that had all the features I wanted nor the desired finish. Mine being a stainless steel barrel, and all the options I found that had what I wanted were either

out of stock or blued in finish, I decided I'd have to design and make exactly what I wanted. I'd finally narrowed my drawings down to two similar designs.

My first steps were to take the design I had, shrink it down to be more streamlined and weigh considerably less, but still possess all the features that I wanted on the part and not look clownishly large when installed. The muzzle diameter on my blaster is one inch, so I knew what that one diameter would be.

After a few different attempts with the drafting software and a hard drive loaded with rejected designs, I determined that the body would need to

be 1-1/4" in diameter to get the desired pocket size and still be small enough to look like it belongs in its place. Due to these parts being made of stainless steel to match the barrel, which is a very dense material, I machined away metal in every possible area to cut down the weight.

I had also milled 1/8" off of the top and bottom of the parts to thin them out to one inch to match the smaller diameter and muzzle size. As some of my fellow longrange enthusiasts know, the 6.5mm family of cartridges already are rather tame in terms of

CUSTOM MUZZLE BRAKES CONTINUED

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Far left: Both blanks have been milled down to one-inch thick, with generous flats to help with "timing" the brake to the rifle and as a starting point for the pockets and finish machining. Left: Business-end view of the brake.

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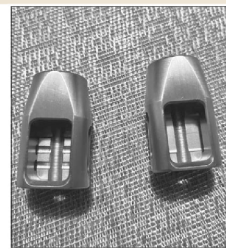
Far left: Both blanks have been milled down to one-inch thick, with generous flats to help with "timing" the brake to the rifle and as a starting point for the pockets and finish machining. Left: Business-end view of the brake.

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Far left: After all the machining has been completed, this top view shows both options I have given myself. The model with the array of three holes (left) and the model with the fulllength slot (right). Notice the top flat surface has been hand-lapped and polished after the entirety was bead-blasted. Left: Opposing views of the two models, showing the arrayed-hole model (left) and the slotted model (right).

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Far left: After all the machining has been completed, this top view shows both options I have given myself. The model with the array of three holes (left) and the model with the fulllength slot (right). Notice the top flat surface has been hand-lapped and polished after the entirety was bead-blasted. Left: Opposing views of the two models, showing the arrayed-hole model (left) and the slotted model (right).

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of recoil. So the two brakes I've come up with feature large pockets up top to direct gases upwards to tame felt recoil even further, as well as one having an array of 3/16" holes and the other having 3/16" wide slots on either side to further disperse gases. Both brakes feature 3/8" diameter round-bottom pockets leading into the port and starboard features. Both options feature a 9/32" bore to eliminate any chance of "baffle-strike" by the bullet and 5/8-24 threads to attach them to my muzzle.

I also undercut the bottom of the threaded hole to help the brake bottom out and assist with getting those threads all the way to the bottom of the hole. The tap I have includes a leading taper that covers the first two threads, so the undercut allows the tap to cut full diameter threads all the way down the hole. I also engraved a version of Marvel's

Punisher character logo on each one, with one having the older version of the logo and the other having a more recent version.

The brake that I put the older version on, I also added some custom lettering with my last name below the emblem. This lettering, with the custom leather sling with my name on it, will set my rifle apart in more ways than most. After all the machining was done, I bead blasted all the surfaces, including the insides of the pockets on the top and sides until all of the machining marks disappeared or smoothed out.

With some sheets of 320- and 400-grit sand paper and some light cutting oil, I hand-lapped all the flat surfaces to a polished shine before finishing the entire outside with a pass of Scotch-Brite scrubbing pads to round off any last adjoining

edges. This, I feel, gives these parts a gorgeous contrast of the polished flats and the matte finish of the rounded facets and pockets.

To assist with installation I went back to Brownells to order one of their Muzzle Shim Kits for .30 caliber and 5/8" diameter muzzles along with an AR-10 crush washer also for 5/8" threads.

Not knowing exactly where the threads start radially in the parts I made, I didn't know exactly how they would "clock" or "time" on my rifle, so I ordered both in case it was just a short distance to cover (thus necessitating the shims) or if it would Far Far The model with the array of three holes (left) and the model with the fulllength slot (right). Notice the top flat surface has been hand-lapped and polished after the entirety was bead-blasted.

CUSTOM MUZZLE BRAKES CONTINUED

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Above left: Opposing views of the two models, again showing the arrayed-hole model (left) and the slotted model (right). Above right: Finished tapped threads for mounting to the muzzle threads on the rifle. You may also notice the lapped and polished flat surfaces, too.

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Above left: Opposing views of the two models, again showing the arrayed-hole model (left) and the slotted model (right). Above right: Finished tapped threads for mounting to the muzzle threads on the rifle. You may also notice the lapped and polished flat surfaces, too.

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Below: The engraving choices were added here. I put the older version of the emblem on the arrayed-hole model (left), along with the custom lettering below it to really set this rifle apart from all others. The slotted model (right) bears a more recent version of the emblem. I would like to thank the Marvel Cinematic Universe for creating these stunning symbols.

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You may also notice the lapped and polished flat surfaces, too. be a considerable distance (thus needing the AR-10 crush washer). Now, to choose which one I'd rather have installed. Decisions, decisions... Thank you all, as always, for reading. I hope this outline can, in some way, help other gunsmiths or hobbyists to bring a design of their own to fruition.

I know that some of us gun enthusiasts often find that we need something for a gun, but I put the older version of the emblem on the arrayed-hole model (left), along with the custom lettering below it to really set this rifle apart from all others. The slotted model (right) bears a more recent version of the emblem. I would like to thank the Marvel Cinematic Universe for creating these stunning symbols. can not find exactly what we want a majority of the time.

Short of contracting a machine shop to make a custom part, this should give you the basis for how to do it yourself. I'd like to send a special thanks to Brownells for having the needed parts and tools, Marvel and their Cinematic Universe series of movies for the two emblem designs, and Auto Desk for the use of their drafting and design software. AG

MACHINING

AMT Hardballer 1911

What's old is new. An overview of working vintage handguns such as the Arcadia Machine & Tool Hardballer 1911.

BY ROBERT K. CAMPBELL JUNE 2023

ORIGINAL PP. 16–19

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Recently, I have ran across several types of handguns I have not seen in more than a decade. Among these were not one but two 1911 Hardballer handguns made by Arcadia Machine & Tool spotted the same week after a drought of more than ten years. One pistol worked well and the other had several issues, which seems par for the course from AMT. These pistols were generally available around 1980 and were in some form of production for more than twenty years.

The pistol's quality control is an issue with one shooter running his pistol since new without complaint and another having no luck with reliability at all. For what it is worth the guns made in the 1983 era seem best. Just the same, I would never purchase this pistol save as a curiosity or range gun; they do not impress me as service grade. We are starting to see firearms such as the AMT Hardballer in the gun shops and on gunsmith benches more often for two reasons, each related.

The first reason, older shooters are selling their collections. As an example, a Ruger Speed-Six and a Colt 1910 Lend-Lease were recently seen in a shop as well as a modified Colt

1911 from 1918. The second related reason, firearms are sold as part of an estate. As more members of the Greatest Generation and Vietnam vets find peace, their children may liquidate the collection.

I would normally steer first time shooters to other guns, but just the same, the pistol illustrated here was brought in for examination by a young shooter who had seen the AMT used in The Terminator movie and recognized it on the shelf at a pawn shop. That is reason enough in my book for buying a recreational handgun! During the past decade or so we have been spoiled by reliable but affordable 1911 handguns.

Those priced in the four hundred dollar range are popular and probably constitute the majority of 1911 sales. General 1911 problems sometimes show up in these pistols. They are of cast construction rather than forged, which is fine if properly done and they have given shooters quite a bit of experience. As a point of interest, the AMT pistol exhibits a casting line on the hammer and the grip safety as well. These handguns area fertile ground for improvement or simply bringing them up to reliable function.

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One of the AMT pistols I examined had a safety that did not indent properly. The plunger was putting insufficient friction on the thumb safety even though the plunger tube itself was fine and properly lined up. I replaced the plungers and springs with parts from Brownells. That was the first concern. After this expedient the slide lock safety engagement, while improved, did not have the rigidity I wished to see in a defensive sidearm. Several avenues of improvement were explored.

The safety seemed to be properly engaging the cut out in the slide and functioned so it was left at that. Next, I examined the firing pin. An extra power firing pin spring is an important safety feature in a pistol that does not have the Series 80 firing pin block. Not only does the firing pin spring retract the spring in the inertia-type system after firing, the firing pin spring also prevents the firing pin from taking a run forward if the pistol is dropped on its muzzle.

The pistol was fitted with a Wolff Gunsprings heavy duty firing pin spring and a Wilson Combat Series 70 firing pin. This neatly enhanced the

pistol's safety. Both pistols had functioned and fed, however, one showed signs of a clocking extractor, which is simply an extractor that moves in the extractor tunnel. A new extractor is often the cure but in this case there was another concern: the firing pin stop was loose.

The pistol functioned but brass was thrown back into the shooter's face since the extractor was not properly adjusted. I could have peened the firing pin stop but since I had a Wilson Combat firing pin stop on hand I instead replaced the original. Filing was minimal and in the end a good tight fit was achieved. I also noted that the pistol featured a grip safety that was practically a small GI grip safety. Many modern shooters are used to the beavertail design and don't quite get it with the GI design.

When they adopt the two thumbs forward technique this higher grip can raise the palm off of the grip safety and the result is a failure to depress it adequately. We never design to make a safety inoperable and instead work to make it easier to activate by tuning the grip safety. To begin,

understand how the leaf spring works. If you look from the back of the 1911 you will note that the leaf on the right pushes to the rear and exerts pressure on the grip safety.

You may bend the leaf forward to reduce the pressure needed to depress the grip safety. Replacing the grip safety is another option but for the gun to remain GI in appearance—and for less expenditure—bending the spring is an option. However, care must be taken in this modification as you may increase the likelihood that the inertia of the grip safety would overcome the spring in the case of a dropped pistol. The grip safety doesn't really need much pressure to be activated but it does need movement.

Remember the contact area is where the bump on the grip safety contacts the trigger stirrup. Moving on, I addressed the issue of galling. This is a common occurrence with early stainless steel handguns including the Smith &

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Wesson models, Randall 1911, and a few others. Eventually two types of alloy were used to combat this galling. To the best of my knowledge, Colt never suffered galling with stainless 1911 handguns. Galling is wear from excess friction and can be frustrating to address. Two alike stainless parts will sometimes gall under friction pressure. The materials sometimes actually freeze together. A lack of lubrication is one culprit and a lack of cleaning the other.

It seems stainless pistols are more likely to gall when ran hot for long periods. Galling hasn't been a real concern in along time with modern pistols, however, with AMT and other vintage guns getting into the hands of shooters—and who knows about Windage adjustment is on the sight body itself while elevation is accomplished by a screw in the long sight bar. foreign guns?—the problem is likely to come up again. A liberal dose of Ballistol or Wilson Combat's gun oil works fine.

A specialty grease containing copper, aluminum, or calcium oxide works even better. Modern stainless steel pistols usually have a frame with dissimilar hardness ratings compared to the slide but this isn't a guarantee with the AMT Hardballer as it was the first stainless steel 1911. Parts interchangeability with the AMT Hardballer and other 1911 handguns seems in the middle range. Please note, I am only talking about the example I have and there is a good chance specifications were changed during production.

I have only scuttlebutt to back this statement up! In my experience, most parts work without fitting and others fit after some work. As an example, I had on hand a Springfield Mil-Spec 1911 handgun. This hard-used 1911 is among my favorite beaters. Sure, I have maintained the Springfield but it has seen a lot of use and often accompanies me when hiking or exploring. The Hardballer accepts standard drop-in slide lock safety levers, slide stops, and grip safeties.

The slide slips onto the Mil- Spec frame with little effort and the Mil-Spec slide ran onto the AMT frame with little effort. However, the AMT barrel was a loose fit in the Springfield and the AMT slide would not accept the Mil- Spec barrel hood. The parts likely to be replaced, such as the firing pin, springs, slide lock safety, grip safety, grips, and magazine, all exchange well. The barrel would require fitting. Another concern is the trigger.

I don't like doing an "action job" these days as I feel that it is better to simply purchase an action set from Wilson Combat. The AMT takes this matter out of our hands. The trigger channel is larger than a standard 1911 so you cannot trade out the trigger. It seems larger than most 1911 triggers. With the company out of business I doubt used parts are available so I would recommend against attempting an action job. The internals are none too well polished and sub par metal doesn't take an action job well.

I suppose the Colt Gold Cup trigger which is wide might be fitted but this would be laborious.

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When researching the AMT I ran across an example with the rear sight missing. I recall having an AMT on the desk thirty years ago with a missing sight but cannot recall the outcome. The rear sight is held in place by a roll pin which is of the hollow type. Replace it as a preventive measure. Hollow roll pins are notorious for giving up the ghost and allowing Colt Gold Cup sights to take flight. A drill bit #60 or an Allen wrench should work for this job.

The pin doesn't always completely take flight, it may break and not fly away, leaving the sight in place. This isn't strictly an AMT problem, Colt also had its share of problems with the Gold Cup. Brownells, Kensight, and perhaps a few others offer bags of roll pins at around \$4.99. The Real Avid gunsmith tool set star #2 works well to adjust

the sight. This sight doesn't quite look like anything else and I don't suspect it is an item likely to survive hard use.

This brings us to the final tip on the AMT Hardballer. I think quite a few have been retired or the shooter spent too much money modifying the pistol because the rear sight flew off or came apart. It would be difficult to install a Smith & Wesson revolver sight as an example. Novak or Heinie sights would be very difficult as the top of the slide with its long rib are designed for a specific adjustable sight. As it turned out quite by chance I had on hand several types of sights.

The Ruger GP100 rear sight, common to many adjustable sight Ruger revolvers, is very close to the AMT. I was surprised to find these sights for sale for less than twenty dollars. The dimensions are so close to the AMT one may wonder if perhaps Ruger supplied the sights to AMT or if

they were reverse engineered. The sight's opening for the roll pin is in the proper place and sight height is the same. This would be an improvement over the original AMT sight.

However, since the AMT was functional as is, I did not actually strike out the roll pin and replace the sight. It appears that the Ruger GP100 unit is slightly wider than the AMT so file work may be indicated. Just the same, this is the easiest sight replacement and most economical of the options should an AMT cross your bench. The AMT Hardballer was the first stainless steel 1911. It introduced quite a few problems to the shooting public and gunsmith.

Yet, the pistol is well made in most examples and may be brought up to a higher standard with careful gunsmithing. You just may see one soon!

AG

PEOPLE & COMPANIES

Rimfire Rifle Aperture Sights

An aperture sight with a longer sight radius can improve accuracy. I bought one and built another.

BY GLEN CALVERT JUNE 2023

ORIGINAL PP. 20–22

I have found that I can shoot more accurately with an aperture sight than with a notchtype sight. The small diameter hole in the aperture allows me to better center the front sight versus the typical larger rear notch. Increasing the sight radius is a proven means of improving accuracy as well. I bought an aperture sight for my Ruger 10/22 that replaced the original front and rear sights and increased the sight radius from 18 to 24 inches on a 20-inch barrel, a significant 33%.

The rear sight is installed using the two rearward scope base mounting holes and the new front sight assembly is installed in the existing dovetail. The sights are from Tech-Sights, LLC (Tech-Sights.com, and they offer two types for the 10/22: the TSR100 “GI” type with two apertures that can be flipped forward or rearward to adjust for distance and the TRS200 with an elevation adjustable rear aperture. Both have windage adjustment on the rear sight and an AR-15 type elevation adjustable front post.

I bought the TRS100. The company also sells several other sights for a variety of rifles. I performed a baseline test with the original sights, firing three groups of five shots at 25 and 50 yards. The sights on the 10/22 had fiber optic inserts which I thought might be better than the older style notch sight from a previous model. Turns out that the rear sight fiber optic did not really help, at least in bright daylight. I then installed and zeroed the new sights and repeated the tests.

The instructions are easy to follow, and I had no problems installing the sights. The original front sight is drifted out of the dovetail and the new sight tower is installed and locked into place with three screws. The rear sight is installed on the receiver with two screws. The aperture sight and its longer sight radius. Below center: 10/22 original rear sight. reduced the average group size by 50% at 25 yards and 46% at 50 yards.

I took my time when doing the accuracy tests, trying to be as precise as possible so as not to shade the results. The results are in the accuracy table. I used CCI Standard Velocity ammo for all the tests. The GI-style sight looks good on the 10/22, giving it a M1 carbine appearance, although the TSR100 front sight is considerably taller. I have a couple of issues with the adjustments, however. The windage adjustment is hard to turn due to the stiff detent and no grip surface.

I used a 3/32" diameter punch to depress the detent and turn the wheel. The front post appears to be the same as on an AR-15 sight but has five slots for the detent whereas my AR-15 front sight tool only has four pins, so it didn't work on this sight. I had to push the detent down with a 1/16" diameter punch and turn the post slightly to keep the detent depressed and then push



on one of the notches to index the post to the next notch. Fortunately, it didn't require much adjustment to zero the sights. With the stiff detents, the sights won't get knocked out of alignment due to rough handling. I was impressed with the quality of the sights and consider them a worthwhile improvement at a reasonable cost despite the rather awkward adjustments. I have a Savage B22 bolt action in 22 Long Rifle that has proven to be very accurate. It has a free floated 21" barrel and the Accu Trigger.

I wanted to add an aperture sight with a longer sight radius but, unfortunately, Tech-Sights does not offer one for that rifle. I decided to build an aperture rear sight that would work with the original front sight. The front sight is attached to the barrel with two screws as opposed to a dovetail. I determined the height of the aperture by using a straight edge from the top of the front sight blade through the rear sight notch and measuring the height at the rear of the receiver.

This showed me that the rear sight had to have a low profile to avoid needing anew, taller front sight. The rifle had two scope bases installed at the factory, so I removed the rear one and used the holes to mount the aperture sight base. I



designed the aperture sight with elevation and windage adjustments. I milled and filed the bottom of the sight base to match the profile of the receiver.

The elevation adjustment is provided by the bar mounted to the base and the windage adjustment is on the aperture bar at the rear of the elevation bar. Each is moved by a small screw. The elevation bar pivots on a small diameter pin with elevation adjusted by 6-48 screw that goes through the bar into a tapped hole in the base. A small spring is located under the bar to provide upward pressure and ensure the bar moves upward when a higher point of impact is required. The windage screw is a 1" long 6-32 screw.

I would have preferred to use a 6-48 screw but could not find one longer than 0.5" at my local supplier. I drilled a pilot hole for this screw through the elevation bar and the aperture bar at the same time to ensure proper alignment. I drilled and tapped the aperture bar for the 6-32 threads and used a #29 drill to provide minimal clearance holes in the elevation bar. A small diameter spring was shortened to a suitable length and added on the left side of the windage screw to eliminate endplay.

I USED A NYLONINSERT LOCK NUT ON THE END OF THE



Base, elevation bar, aperture bar, adjustment screws and springs. screw. The nut is large enough to easily adjust the windage but is not obtrusive. This turned out to be a simple and effective way of assembling the parts. Granted, it is not as an elegant design as the Tech-Sight but it works fine. The elevation and windage screws work smoothly with the needed precision and stay zeroed. The aperture has the 0.062" diameter hole that I prefer. I ran the same tests as on the 10/22.

The aperture sight increased the sight radius from 16.75" to 24.5" (45%) and together, they reduced the average group sizes by 52% and 47% respectively as shown in the table. So, how much of the improvement is due to the aperture sight

and how much is due to the longer sight radius? The accuracy on the 10/22 was improved by an average of 48%. The sight radius was increased by 33%, so was the additional 15% due to the aperture sight?

The Savage sight radius increased by 45% but the accuracy improvement averaged 49.5%. There is probably a limit to how much a longer sight radius improves the accuracy due to the law of diminishing returns. As I said earlier, an aperture sight typically allows me to center the front sight better but the notch sight on the Savage gave me a clear sight picture, better than on the 10/22. In my opinion, the improvement on the Savage was mainly due to the sight radius increase.

Installing the original sights at the longer sight radius or installing the aperture sights at the original sight radius would help answer the question but I am not inclined to spend the time nor effort to find out. The aperture sights and longer sight radius significantly reduced the group sizes at a reasonable cost. The cost for the Savage aperture sight was mostly my time and a few dollars in hardware as the rough material was left over from previous projects.

Someone with better eyes could likely shoot smaller groups than I did. This project had the right amount of technical challenge, didn't cost much, and helped the winter months go by more quickly. AG

READER FORUM

Reader Forum

BY AMERICAN GUNSMITH EDITORS JUNE 2023

ORIGINAL PP. 23–24

Generational Changes and Firearms I want to thank Brian Smith for his special report “Generational Changes and Firearms” (April 2023). I read a lot and cannot remember enjoying reading an article as much as that. Being born in 1956, I felt like I was living my life all over again while reading his piece. The contrast between the way things were then and how they are now is shocking. Wish I was back in 1970. Thanks for the memories!

David Morrison powderburns.gunsmithing@
“Generational Changes and Firearms” by Brian Smith was an excellent story on generations and guns. So good, that it applies to about any aspect of what is important to young people versus older people. For example, the only way that we can keep ham radio alive is to move it into digital modes, otherwise, ham radio would be dead by now. In the same issue I asked about my Stevens Model 94B in the Reader Forum and received a lot of good advice on it.

I finally got the hammer pullback just right with the removal of two coils and then pushed the mechanism back together again. The old gem is now a jewel. Compression springs are complex devices. Compression load with deflection can vary from one design to the next one. One of my other restoration projects, an Enders Arms Double 410, had a mangled ejection spring.

Since my search for an original replacement was unsuccessful, I went to the local hardware store where I found a 7/32 in compression spring when cut to length it fit perfectly and produced just the right amount of force for ejection. Now I am on a tear to find away to create a screw to replace a lost screw for the forend slide of a Remington Model 14. I have this gun almost back to brand new, except for the missing screw. So far, finding a screw to work directly or to be modified is proving to be a big task.

Now I need a lathe. It’s a good thing my time is charged off as a hobby and not to be paid for by a customer! Kleingeunther Ejector I have a shotgun that was imported by Kleingeunther probably during the 1970s or very early 80s. The top barrel will not eject due to some problem in the mechanism. I can’t seem to find the right combination to disassemble this part. Can you tell me from the pictures how to go about disassembling this part of the shotgun and possibly who the manufacturer was.

I looked yahoo.com up Zolid but those shotguns look too high-end for this to be one of theirs. Kenneth W Wright From Mark Hollensen (Bench-MarkPerformanceServices.com). I don’t know a whole lot about this particular shotgun other than it was in import and KDF (before being bought out) sold them through their shop in Seguin, Texas.

Without the gun in front of me, I would be guessing about how to remove the ejector(s) and before starting, parts should be located as many ejectors are spring loaded into the slot and can break during removal if not careful. Robert Tusch The current KDF gun shop is at 2485 N State Hwy 46, Seguin TX 78155 (800/KDF-GUNS, KDFguns.com). I would contact them first to ask about what shotguns are in their possession along with parts and/or a gunsmith there that has worked on them.

Bolt Carrier Tilt I’ve read all of the articles by Joe Carlos after meeting him at Camp Perry during the National Matches and would like to thank him for sharing his wealth of information with us! Has he tested the impact of the lift the bolt carrier in an AR-15 gets from having a magazine inserted? Seems like the magazine could both reduce carrier tilt and also potentially push the “enhanced” carrier he was proposing up too high to where it’s no longer aligned?

I was fiddling with my large frame AR and there’s quite a noticeable lift to the bolt carrier when the mag is inserted with or without rounds in the magazine. Thomas Keefe Joe Carlos responds. I have been studying the influence of magazines on the AR for decades and have been reporting on those studies in American Gunsmith.



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Magazines have a huge vote in the performance of Stoner Platform rifles. As you have observed, there is so much slop in the size of the “bore” of the upper receiver and the carrier that magazine pressure on the underside of the carrier moves it up. Different magazines evidently exert different amounts of lift. This can cause variations in downrange point of impacts. The target scan that I have attached illustrates this clearly.

The difference in the center of the two groups on the left and the group on the right was measured as 2 1/4" at 100 yards. I reported on this in an article titled, “Magazine Checks” in April 2015. As you point out, these same magazine pressures likely interact with the carriers relative to the tilt that I wrote about in another article titled “Combating Bolt Carrier Tilt” published in May of 2017.

That said, however, when I was trying to find solutions to tilt I did shoot a number of AR-15s employing a variety of magazines in the machine rest. The average improvement in group sizes was 14% using the anti-tilt pads on the bottom rear of carriers. Customers who have purchased carriers from

me with the Anti Tilt Pads have no doubt also used magazines with varying degrees of lift. Many of those customers have written to me describing improvements in group sizes.

So the conclusion I arrive at is that the lift that magazines provide is not an adequate solution to bolt carrier tilt. The various parts of the Stoner Platform do interact with each other as this carrier/magazine discussion points out. You can’t “fix” AR groups by only concentrating on one part of the rifle. You have to improve many parts and take into consideration their interactions.

The subject of bolt carrier tilt and magazines was covered in at least one other article I wrote for the magazine which was titled, “AR- 15 Fliers”. This started in February 2021 and went for three months. Some gas gunners think that the only way to shoot an AR is to fill up a 30-round magazine and proceed to empty it in the general direction of the target.

Serious National Match Course (NMC), F Class, and Palma AR shooters actually use single shot mags called “Bob Sleds” that have no spring or follower and only shoot one round hand fed one at a time through the ejection port. These Bob Sleds exert no upward pressures on the bottom of the carrier and are my go-to choice in slow fire events. AG

SEARCHABLE ISSUE RECORD

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