



JAN 2023

DIGITAL ARCHIVE
EDITION

PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

A TECHNICAL JOURNAL OF CRAFT, REPAIR & RESTORATION

01

ARCHIVE ISSUE NUMBER

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WINCHESTER 1895 RESTORATION

MIDWEST INDUSTRIES • REMINGTON 870 CUSTOMIZATION • STAR PD • SALES PRACTICES

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DIGITAL ARCHIVE EDITION

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AMERICAN GUNSMITH

DIGITAL ARCHIVE EDITION • JANUARY 2023

ISSUE RECORD

ORIGINAL DATE	January 2023
VOLUME	Archive volume not stated
ISSUE NUMBER	01
SOURCE ID	ag-f969fafabb605de94b1fd261

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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PISTOLS

Midwest Industries

BY AMERICAN GUNSMITH EDITORS JANUARY 2023

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Founded in 2003 in Waukesha, Wisconsin, Midwest Industries makes a variety gunsmith tools and accessories for firearms. The majority of their products are designed and manufactured in their Wisconsin facility and are backed by a lifetime guarantee. Among their newest is the Pistol Caliber Carbine Block For Glock (\$39.95).

This armorer's block fits Glock 9mm, .40, 10mm, and .45 caliber firearms, being compatible with both handguns and pistol-caliber carbines based on the Glock, including the Kriss Vector and Ruger PC Carbine. Made from of a high-strength polymer construction, this block has mounting holes for attachment to your work bench and securely locks the firearm via its magwell for maintenance. There are also multiple points of contact for vice use.

The AK Receiver Maintenance Block (\$39.95) is compatible with most AK-47 and AK-74 variants, although minor fitting may be required on with some versions. In addition to being bench mounted or vice held when holding the firearm for repair, this block also secures

the bolt for complete disassembly and reassembly. Midwest features a line of M-Lok and sight systems for lever actions.

The patent pending Extended M-Lok Sight System for Henry and Marlin 1894 and 1895 variants modernizes classic pistol and rifle caliber lever actions to accept various accessories in a modular manner. Constructed from anodized 6061 aluminum, the forend is slim and lightweight while remaining rigid and providing multiple points of contact with the firearm. A forward-mounted sling swivel allows use of conventional hunting slings and the M-Lok rails allow multiple attachment points.

A five-slot M-Lok rail section is included and more can be added. A full-length top Picatinny rail can mount optics, lights, lasers, or other additional accessories. For backup, a heavy-duty front sight post and steel rear aperture ghost ring rear sight with wide windage and elevation adjustment can be set for a range of different ammunition. A sight adjustment tool is included. Contact Midwest Industries (MidwestIndustriesInc.com), about their complete line of tools and parts.

FINISHING

Winchester 1895 Restoration

A tale of the Winchester 1895 that wouldn't cock. Sorting out this old lever action seemed more like archaeology than gunsmithing.

BY BRIAN R. SMITH JANUARY 2023

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Above: Customer's Winchester 1895 whose serial number attests it having been made in 1901. Chambered in 30 Army (30-40), it features a scalloped receiver and a barrel shortened by a previous owner to 22 inches.

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Everyone likes a deal, and I have a few acquaintances and customers who are more than avid bargain hunters. Such was the case with one customer who showed up the Monday evening after a particularly successful hunt at a weekend gun show. "It's in great shape," he said. "Except that it has no blueing left, and somebody cut the barrel and installed a banded front ramp.

And the hammer doesn't cock." The action was already open, his having paid heed to the sign at the door admonishing all to ensure that their firearms be unloaded. With the muzzle pointed in a safe direction, he levered the bolt forward and sure enough, the hammer followed to the safety notch. I immediately thought "broken sear," or "broken sear notch in the hammer." Maybe the top of the hammer was too worn.

Taking the rifle in hand, I tried several cycles of the lever, slowly at first and then "running it like I stole it." With aggressive levering, the hammer cocked maybe twice in a dozen tries but would push off with thumb force. Taking up a small flashlight, with the lever dropped it appeared the sear spring was in place and intact. As I filled out a tag, the proud new owner asked what I thought it could be. "Can't say without running more tests, maybe some imaging, and probably some exploratory surgery.

You have insurance, don't you?" His face got a little pale. John M. Browning's final lever action rifle design was a departure from all previous lever actions in that he intended it to be for thennew higher pressure smokeless Chambered in 30 Army (30-40), it features a scalloped receiver and a barrel shortened by a previous owner to 22 inches. rounds. Recognizing the trend toward "spitzer" bullets (German for "pointed"), he selected a box magazine that would allow for handling such ammunition.

That decision resulted in the characteristic profile of the Model 1895 that polarized shooters of the day and ever since—the Carcano-Enfield-Mannlicher-Mosin-style protruding magazine created a love/hate relationship with the 1895 that exists among shooters and collectors to this day. Like the sibling Model 1894 Winchester, the 1895 also "dropped its guts" out the bottom of the receiver when the lever was lowered, a characteristic not favored by some riflemen.

Chamberings for the 1895 included 30 Army (30-40 Krag), 30-03, 30-06, 7.62x54r, 303 British, 35 Winchester, 38-72 Winchester, 40-72 Winchester, and 405 Winchester. Ironically, the 38-72 and 40-72 were blackpowder rounds that Winchester elected to include in its offerings when the Model 1895 was introduced. The largest number of 1895 Winchester were muskets made in 7.62x54r for a contract for the Russian Tsar, 295,000 of them.

It's been said that the Americans who went to Russia to fight against the Red insurgents during the Revolution were supplied 1895 muskets chambered in the Russian round. Today, those muskets are scarce in original condition and bring steep prices. The cartridge most associated with the Model 1895 by the American public is probably the 405 Winchester, thanks to President Theodore Roosevelt, who used it extensively for big game hunting in Africa.

He also carried one in 30 Army during the Spanish American War and '95s chambered in that same 30-40 round is the one that's most likely to be found in gun safes, gun shops, gun shows, and gunsmith benches, just like the subject rifle of this article, which was made in 1901. I have three '95s myself, a 26-inch rifle in 30 Army that I restocked in walnut and is a companion to a lateproduction 1895 in 30-06, which I stocked years ago in bird-eye maple and eventually bushed the bolt face for the firing pin.

The third one is a Winchester-Miroku 1895 in 405 Winchester (just because) that a previous owner had cut to 20" and also installed a currently-made copy of a "climbin' Lyman" rear sight matched with a green fluorescent inserted front bead. Yes, with factory ammo the '95 in 405 "kills at both ends," but I've long ago graduated to mostly shooting 405 Winchester cartridges loaded with 12 grains

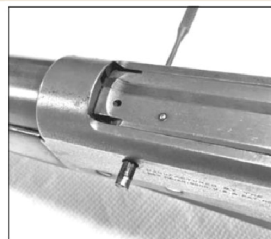
WINCHESTER 1895 RESTORATION CONTINUED

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Above left: The 1895's breech bolt can be removed fairly quickly by unscrewing the plug screw at the front left of the upper area of the receiver and driving out the connector pin from right to left. Above right: With the connecting pin removed, lowering the lever as normal will push the bolt to the rear. Pulling down on the lever will free the lever forks from the breech bolt, which can be pushed to the rear over the hammer and out of the receiver.

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Far left: The subject rifle exhibited an enormous quantity of accumulated schmutz on the locking bolt and other internal parts, in the underside and face of the breech bolt and in the bottom of the magazine well. Left: The lever assembly is connected at only two points—to the front of the breech block by the connector pin and to the lower tang at the end of the lever link, which is held fast by the pin being driven out as shown. That pin also retains the lever catch and its spring and plunger.

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ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

Pulling down on the lever will free the lever forks from the breech bolt, which can be pushed to the rear over the hammer and out of the receiver. of Unique under a 300 grain bullet that does about 1250 to 1300 feet per second in front of the muzzle, is wickedly accurate, and provides a satisfying “thunk” on the 100 and 200 yard gongs at my local club. I like the ‘95, despite it not being terribly ergonomic for one-handed balanced carry.

Returning the customer's rifle, I elected to do a quick reconnaissance of the interior, fully expecting to be contacting the usual suspect parts vendors for a replacement hammer. A partial disassembly was indicated for this exploratory procedure, so the plug screw at the upper left forward area of the receiver was removed and the pin connecting the bolt to the lever forks driven out from the right side.

Prior to using the punch, both sides of the bolt were seen to be pretty filthy, and the ends of the pin were not visible as a result. I scraped out both ends of the pin so that it could be aligned properly with the left hole in

the receiver and knocked it out. The lever was rotated down partially to bring the bolt out of battery and to the rear, just starting to push the hammer back. The lever forks were swung down and out of the receiver, and locking bolt was confirmed that it was at its lower end of travel.

Using a thumb, the breech bolt was pushed back while the other thumb was used to lower the hammer away from the breech bolt to facilitate the breech bolt's withdrawal. With the bolt out of the receiver, the hammer actually stayed cocked this time, but minutes later it snapped forward on its own. With the aid of an LED light, I took a look inside the receiver.

We've all seen some dirty firearms, but the first thing that came to mind was a saying my great-grandmother used to use—“Ja sehr verschmutzt”—yes, very dirty, but in this case an understatement. The case feeder and top of the extension on the front of the locking bolt had a mound (pile?) of greasy, black dirt covering it, with 1/8" to 3/16" square loose

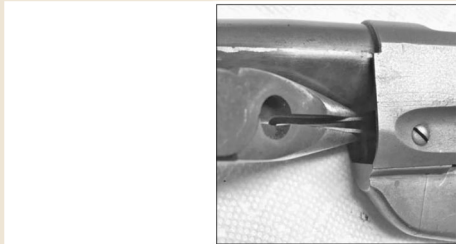
flakes of the stuff hanging here and there. I began to think that this old ‘95 had never been cleaned except for the bore.

The nooks and crannies of the breech bolt face and underside were equally and copiously caked. I had to clean out the notch in the side of the ejector where the lower end of the vertical ejector stop pin would normally be seen, so that it could be drifted out through the top of the bolt. The coils of the ejector spring were filled with the schmutz as well. The ejector would compress into the bolt body, but it did not move freely in or out; it was slow in both directions.

The firing pin lock at the rear end of the breech bolt was also “stuck” in its slot for all the filth. Shining the light into the magazine well, the dirt at the bottom of the stamped cup was sufficiently deep to grow crops. It was at that point that the decision was made to cease gunsmithing operations and switch to archaeology—this Far That pin also retains the lever catch and its spring and plunger.

WINCHESTER 1895 RESTORATION CONTINUED

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Above left: Once the mainspring screw and mainspring are removed, the hammer screw can be unscrewed and the hammer withdrawn up through its window in the top tang. Note that with the sear and sear spring in place, the hammer will need to be pushed forward against the sear so that its tail clears the rear of the window. Above right: This 1895 is an earlier model that made use of a "V" configuration carrier spring whose legs were nested in a groove in the receiver and another groove in the root of the magazine carrier. Both removal and installation of the V-spring are made simple by stout needle-nosed pliers.

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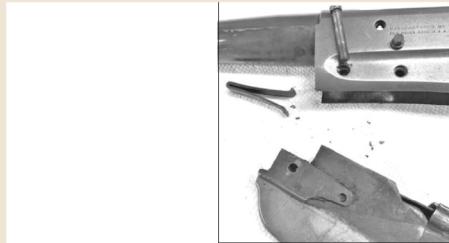
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ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Below left: The magazine carrier screw to the front and the short magazine box screw to the right are shown removed, along with the carrier spring and the withdrawn magazine itself. The welded reinforcement at the front of the magazine and the paper towel show only a tiny fraction of flakes and accumulated crud that adorned this rifle. Below right: The locking bolt required drifting out to the bottom because its mating ways in the receiver were caked with soil that wasn't readily removed.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



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Both removal and installation of the V-spring are made simple by stout needle-nosed pliers. '95's internals needed a thorough cleaning to remove 120 years of accumulated crud. First thing, the stock screw was removed from the rear of the upper tang and the butt-stock slid off.

The pin connecting the rear link of the lever to the lower tang. The welded reinforcement at the front of the magazine and the paper towel show only a tiny fraction of flakes and accumulated crud that adorned this rifle. was driven out, and the lever catch and its crusty spring and plunger were coaxed out of the link using a dental pick. Next, using a pair of needle-nose pliers, the magazine follower V-spring was compressed and removed from the front of the receiver.

Then the two screws on the lower front of the left side of the receiver were spun out; these hold the magazine in place and the forward

ward screw acts as the pivot for the magazine carrier. It should be mentioned that this particular 1895 is an early model, using the V-spring for the magazine carrier and having the magazine box screw on only the left side of the receiver.

Also, the firing pin lock was the early model with long tangs and having no firing pin lock lever or its round wire spring held fast with a short screw. With the magazine box out of the receiver and the carrier removed from it, the locking bolt required tapping down and out of the receiver because its ways were too crusted. Next came the hammer spring screw in the lower tang, which as it was loosened the hammer spring relaxed and took all force from the roller on the bottom of the hammer.

Then the hammer screw was backed out to the left, and the hammer withdrawn up and out of its window in the upper tang. That was the moment of truth— Was the sear

notch damaged or missing? Was the sear broken? Or was the camming surface of the hammer nose just worn so that the bolt wouldn't push the hammer sufficiently down to engage the sear surfaces? None of the above. Instead, the sear notch was packed with schmutz. I started to poke some of it out of the sear notch before I stopped to take a photo.

It appeared that a large flake of the crud somehow knocked loose from someplace in the '95's guts and got stuffed into the sear notch, likely by the sear. Digging out the crap with a dental pick, it was obvious the sear notch was intact. The sides of the sear itself and both the upper and lower surfaces were coated with schmutz, and the buildup on the sides of the sear actually caused considerable friction against the inner walls of the rear of the receiver. This friction, despite the stiff sear

WINCHESTER 1895 RESTORATION CONTINUED

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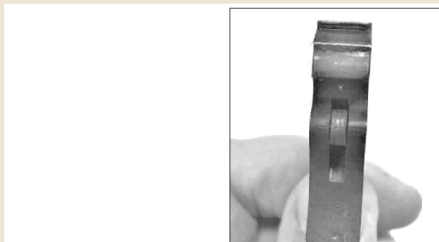
Above left: The locking block was incredibly encrusted, shown here with its cartridge feed extension to the front and lower right. Two plus hours in the alkaline cleaner sorted it out. Above right: The lower left side and outer face of the sear are shown; both sides and the outer and inner faces were thickly coated with dried schmutz that actually rubbed against the inner walls of the receiver and increased overall friction of the fire control group parts.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



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ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Below: The underside of the hammer is shown, with the characteristic mainspring roller of the Model 1895. Above that is the sear notch, which is not really visible because it is packed nearly full with oily dirt. It is believed that the accumulation of crud prevented the sear from fully seating in the hammer sear notch, and is the primary reason for the customer's complaint.

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Left: A close up of the left side of the magazine housing reinforcement and the thick encrustation of filth. The rear of the magazine as well as the other side were nearly identically soiled.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

Two plus hours in the alkaline cleaner sorted it out. spring force, may have contributed a bit to the failure of hammer to cock. It certainly didn't help. Once out of the receiver, the locking bolt, magazine box and carrier, disassembled bolt, hammer, sear, sear Above that is the sear notch, which is not really visible because it is packed nearly full with oily dirt.

It is believed that the accumulation of crud prevented the sear from fully seating in the hammer sear notch, and is the primary reason for the customer's complaint. spring, lever assembly, extractor, firing pin, ejector, screws, springs, and other small bits were placed in a basket in the alkaline cleaner and boiled for an hour or three, then rinsed and finally hot inhibited rinsed.

The parts immediately flash dried, and some areas required special attention with a pick or a plastic tool to remove any remaining schmutz. Then the parts got a wipe down with Weapon Shield oil. Some areas received a brushing with an M16-type cleaning brush to remove residual soil.

The breech bolt was first reassembled, installing the ejector and its spring after coating with Weapon Shield oil and using a small quickaction bar clamp to compress the ejector into the bolt body so that the ejector retaining pin could be driven in from the top. Next came the lightly-oiled firing pin and its retaining pin, followed by the firing pin lock and its shorter cross pin. Finally, the extractor was put in place and re-pinned.

Next, the carrier was reinstalled in the magazine body, and its pivot aligned with the forward hole and held in place with a brass punch. With the barreled receiver on its right side, the magazine was brought into position and started into its mortise in the bottom of the receiver. The punch was removed and the magazine gently pushed into place and the punch reinserted through the forward hole in the receiver and the magazine screw installed in the rear hole but not tightened.

With the carrier pivot and magazine box hole in alignment with the forward receiver hole, the magazine carrier screw was reinstalled and tightened, followed by snugging down

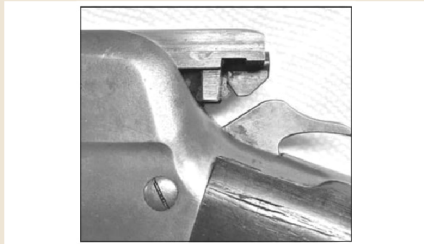
the short magazine box screw. Next I installed the sear spring and screw, curve downward so as to "shed water," followed by the sear itself and its long, thin pin located from side to side in the receiver beneath the hammer screw.

The lower arm of the sear rests under the sear spring, that is, the sear spring bears down on the top of the sear spring's lower arm to provide force for the sear to rotate against the notched face of the hammer. The locking bolt ways were oiled and it was inserted into the receiver from the bottom, with the cartridge feed forward and between the stamped cartridge retaining clips at the rear of the magazine.

Without the hammer in place, make sure that the sear hasn't rotated into the travel path of the locking bolt, or the sear will interfere with its free travel up and down in the receiver. The rear of the magazine as well as the other side were nearly identically soiled.

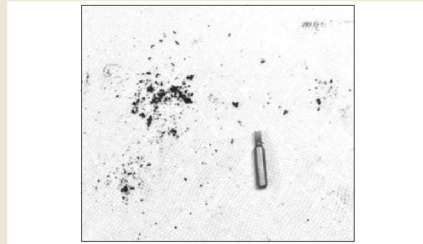
WINCHESTER 1895 RESTORATION CONTINUED

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Above left: Loose schmutz that fell out of the 1895 during disassembly was collected on paper toweling, with a 1.3" long hex drive bit for scale. I estimate these particles represent 1/3 of the total dirt that filled the action's internals. Above right: Success! After a well deserved and far too long overdue bath, the 1895's hammer behaved as it should, never failing to catch the sear in the sear notch every time the action was cycled.

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Below: In lieu of an exploded parts diagram which turned out to be impossible to locate for a non-Miroku 1895, this is an early section view of an 1895 action with the lever down, "guts out," and the breech bolt retracted over the hammer. The four original cartridges for which the 1895 was chambered are listed at left. Other chamberings followed later, including the 30-03, 30-06, 303 British, 7.62 x 54R, and 405 Winchester.

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3" long hex drive bit for scale. I estimate these particles represent 1/3 of the total dirt that filled the action's internals. After a well deserved and far too long overdue bath, the 1895's hammer behaved as it should, never failing to catch the sear in the sear notch every time the action was cycled. The lever catch spring and plunger and lever catch "hook" were next assembled into the lever link, hook facing down, and the pin installed. The spring and plunger received a few drops of Weapon Shield oil.

The hammer can be replaced before or after the lever assembly, but I chose to do it following the lever installation. The hammer has to be The four original cartridges for which the 1895 was chambered are listed at left. Other chamberings followed later, including the 30-03, 30-06, 303 British, 7.62 x 54R, and 405 Winchester. inserted through its window in the top tang, and pressed forward a bit against force from the sear in order to align the hammer axis hole with the holes in the receiver.

After a thin wipe of oil, the hammer screw was reinstalled and torqued. At that point I couldn't resist cocking the hammer—anticlimactically, it cocked and stayed cocked. With the hammer back and the locking bolt down against its lower stop, the breech bolt ways were lightly oiled and it was inserted into the receiver and slid forward.

I made sure the hook in the lever would engage the recess in the front of the locking bolt and swung the lever forks up into their slots between the receiver walls and the magazine, and forward into the pockets on either side of the front of the breech bolt. The lever was squeezed shut to the point that the hole in the breech bolt was in alignment with the hole in the left side of the receiver, and the connecting pin was driven home, followed by inserting and tightening the plug screw.

After a quick function check by working lever a few times and finding the hammer behaved as it should, the buttstock was slid into place between the tangs and the stock screw installed and tightened. Shouldering the 1895,

the lever was worked a dozen times with the hammer staying cocked each time. I placed it back in the rifle vise, and admired the thing for all of several seconds before lifting it back up and working the action another dozen times. Again, the hammer stayed cocked each time.

Before taking it to the club and putting five test round through it, I exercised it another dozen times and again at the range after five flawless shots went downrange. As the customer had previously been notified of the cost of anew hammer, sear, and spring if needed in the worst case scenario, he was pleasantly shocked to see that the invoice reflected only the standard shop charge for a thorough cleaning and oiling.

I saved him the paper towels that had collected about 1/3 of the total amount of crud removed from his '95. We both agreed that all things mechanical deserve periodic cleaning and lubrication, his 1895 having retaught us that lesson and ending up being a bargain after all. AG

PEOPLE & COMPANIES

Remington 870 Customization

The Remington 870 pump shotgun has the capabilities of being faster and easier to manipulate. Adding a red dot and easy to install furniture can really change how the shooter performs.

BY STEPHANIE A. MARTZ JANUARY 2023

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As we look at a stock Remington 870 we see a traditional shotgun. Long length of pull, simple forend, iron sights. No issues, right? It's reliable and has proved itself since 1950. Well, like anything, guns, shooters, and uses all evolve. The uses for the Remington 870 has heavily evolved from being used during the response to Katrina, to now being ran in 3 Gun matches faster than a semi-auto shotgun.

It is a trusted gun that with just a little tweaking can be made into a fast and ergonomically friendly shotgun. "Fast and ergonomic" usually means adding a red dot to the gun instead of running just the front sight bead. Nowadays, many 870s that we see on the market will have pre-drilled screw holes, however, the project gun I'll show here did not. It was a straight Remington 870 Express Tactical with a nondrilled receiver.

When it comes to adding an optic to a gun the first two questions always need to be, "What type/ types of optics do I want?" and "What type of mounting surface do I want?" There are multiple rail options that you can choose, such as mounts that are dot specific or a standard 1913 Picatinny rail which enables you to play with

different optics. For example, the Trijicon RMR (Ruggedized Miniature Reflex) mount from S&W is a very well made mount that mounts directly to your drilled receiver.

However, it is specific to the RMR sight. While the Trijicon RMR is a perfectly viable option for a shotgun red dot, if you want the freedom of playing with different optics you will want to go with a 1913 mounting surface. A Picatinny rail allows you to play with both carbine and pistol type optics. The main thing when it comes to shotgun optics is durability. There is a lot of recoil that this electric box within glass is going to need to withstand.

Meaning, you may not want to go with a non duty-rated optic such as the Trijicon SRO (Specialized Reflex Optic). While it may be a good optic with a large window, it is simply not strong enough for how some run their shotgun. To continue on the mounting surface, let's say that you didn't want to have this due to the top of the receiver having more meat and it thinning out towards the end.

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drill your receiver. No worries. If your 870 is not pre-drilled you do not need to drill it to be able to place a dot on the receiver. There are other options such as mounts that attach through the takedown pin holes, commonly called saddle mounts. These come in both metal and polymer and during installation the takedown pins will likely be replaced by mount-specific screws.

Keep in mind if going with a saddle mount that polymer can bend/ break depending on how the company makes it, but metal can cause rust on the gun or scratch the finish. It is a give and take with both. For this project I mounted a dot on a non-drilled Remington receiver using a EGW Remington 870 Shotgun Picatinny 0 MOA Rail and Vortex SPARC Solar Red Dot.

The goal with installing a 1913 rail for ared dot is to get a properly machined rail with strong screws as those are going to be the main stress point during recoil. It is also imperative that it be lined up straight and that the placement be where one screw A Picatinny rail to mount the Sparc on was chosen due to wanting to have the option in the future to try out different red dots. is in the rear of the gun. The 870 is built with more meat in the rear of the receiver and it thins out as it goes on.

Due to this, drilling one of the screws in the rear meaty portion of the receiver will help it stand up to recoil much better as the screw has more material to grab on to. This project was done the simple way: throw the

receiver in a vise, install the EGW rail onto the receiver, line it up straight as best as your eye sees. Remember, the reason you are putting a dot on it is for fast acquisition once the gun is up. That dot will “float” inside the optic.

The rail placement doesn't need to be perfect but it does need to be straight enough when that gun is in your shoulder with your head up on the stock. It also needs to be straight enough that you can have enough adjustment in the optic to get a proper zero. The more crooked the rail is the more that dot won't have room to get lined up to center. After finding the straight placement spot, take a thin marker or paint pen and cotton swab and place it through the two holes to mark where to drill.

They were different distances apart. You can mic it and measure the distance between the two holes on the rail but this way is more simple. Now time for the mill. Throw it up in the mill and find your bit—sized down if you are questioning the correct bit to use. Drill through one hole and then tap it immediately, putting the rail on with the screw without Loctite yet. While keeping the rail installed, drill and tap the next hole. Take your time tapping as these are small screws and threads.

Leaving the rail installed while drilling the second hole helps you visualize and ensure everything is straight before drilling the last hole in the front of the receiver. Now that everything is drilled and tapped, en-

sure that both screws can thread in with no issues before applying Loctite. Due to these screws having to hold up to a heavy amount of recoil, I used Loctite 271 on the threads of the Torx screws.

On the EGW rail specifically, there were some gaps on the side of where the rail wraps around the receiver. Going back, I would have done more research on what company to buy the rail from, however, the Remington may have been machined imperfect as well so it is tough to match that up. Don't get too frustrated if the receiver doesn't perfectly fit to the rail as you can fill those gaps if you'd like.

Even with some small gaps, this rail and optic has withstood 500 rounds in a day, has a current round count of around 2,000 overall, and still has zero play. Ergonomic and fast also means adding some different furniture to the 870. With anything, if you put the time and effort in you can get efficient with any type of equipment. Look at Jerry Miculek, running a factory pump gun faster than dudes with every aftermarket accessory they can throw on a semiautomatic.

It is possible, but today we have the capabilities of simply making our guns easier to manipulate. The factory furniture on a Remington 870 involves a few things that hinder technique. First, the forend. The factory Remington 870 forend is a simple ribbed design; nothing wild, but

REMINGTON 870 CUSTOMIZATION CONTINUED

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nothing really helpful either. When running a pump gun fast you need something that is easy to reach and easy to grip, push, and pull. Even more so now that the push-pull technique as taught by Rob Haught is becoming so popular. Magpul now offers their MOE M-Lok Forend for the 870. It screws on the same as the factory forend would on the action bars and even comes with the tool for the installation and removal.

This Magpul forend in comparison to the factory is longer, made out of polymer, and has M-Lok slots to add accessories such as a handstop or lights, just as you would use on a rifle. It also has a machined in front and rear hand stop and squared off panels for better purchase instead of the factory rounded-off ribbing which can become very slippery if you're sweaty. To go even further, during this project I decided to stipple it. As always, personal preference.

An easy hour with the Dremel and the grip was drastically improved. Note though, after a 500 round shotgun class the stippling did start to eat up my hands but this is a non-issue with a defensive shotgun that will typically have a much lower amount of rounds through it. Now, the stock.

Length of pull (LOP) and cheek weld are huge when it comes to being comfortable. Shooters are now able to keep their head up due to an optic and can be squared up to the target due to a shorter LOP on the gun, especially with a red dot mounted. Here is a little history lesson to support this.

When you watch old videos of firearms technique with shotguns, say the Gunsite videos made in the 1990s, these videos

show the operator blading to the target with the firing elbow severely up or "chicken winging." We now know this technique is obviously not the most efficient when it comes to defensive shotgun but due to the typically too-long length of stock there wasn't really any way around it. Now when we look up technique we see the shooter squared up to the target with the firing elbow pushed downwards.

This is due to more readily-available aftermarket parts such as the Magpul SGA Stock rather than needing to chop a stock down. The Magpul SGA Stock for the Remington 870 is another easy to install piece that will fit all body types. The stock comes with both LOP spacers and additional cheek risers, allowing shooters with shorter arms to remove spacers as needed and those with longer arms to add them.

The cheek risers aid in getting your head up to mount it behind the dot as now you will be needing to look higher with an optic. The stock also has both a push button sling mount and a thread through. Installation is as easy as three screws and comes with a hex wrench. Let us not forget about a very important aspect to running the shotgun: carrying additional ammunition for efficient loading. During the first World War, U.

S. military personnel using shotguns were issued the M1918 Shotgun Ammunition Bag which could hold 32 shotshells in four horizontal rows of eight loops. Soldiers also slipped shells into a belt or even stock bandoleers. These days we even see extra shells getting thrown into the PALS (Pouch Attachment Ladder System) webbing of a MOLLE (Modular Lightweight Load-carrying Equipment) plate carrier.

For a defensive type shotgun, extra ammunition carriers made to be put on the gun can come in both fabric and plastic form and can be slapped onto the receiver by hook-and-loop fasteners such as Velcro or slid over the buttstock. With anything, there are pros and cons to both and it all comes down to how you want to run your shotgun. As far as ergonomics, the fabric shell carriers or "shotgun cards" such as from HSGI or Esstac can be flipped for both over or under loading on the fly.

Once expended they can be ripped off and a new card slapped in place during a firing engagement. There are also plastic side saddle carriers such as the Tac Star Sidesaddle and a variety of 3D printed versions. While the plastic saddles may be easier to stuff shells into due to the conformed shape, they tend to stretch faster than the fabric cards do.

It is good to note that plastic shell carriers can be easily chopped down from a six to three shotshell capacity depending on what you want for weight and ergonomics of your loading. Shotgun cards can be also be placed into mag pouches on your belt for faster placing of the entire card. Both types of shell carriers are expendable and it is up to you to make that choice based on type of loading, locating on the gun, weight of the card on the gun, and price.

All in all, shotguns have come along way in being more modular and customizable. Remington 870 pump shotguns are not to be scoffed at and with a little practice and maybe some additional customization they can be a very fast and ergonomically advanced pump gun. AG

PISTOLS

Star PD

BY ROBERT K. CAMPBELL JANUARY 2023

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The pistol in question is a handgun I have considerable personal experience with. I was an avid reader in school and first saw the Star Model PD on the cover of Guns and Ammo in 1975. A few years later I took an oath as a peace officer. I owned a Star PD chambered in 45 ACP by then. It was among a very few handguns I owned and at the time each had a specific duty. The Star was a life saver with its reliability, easy shooting, and a hardhitting cartridge. Jeff Cooper hit the nail on the head in his review.

He felt the pistol should be carried much and fired little. A 45 ACP handgun weighing 25 ounces could be controlled adequately for close range personal defense but it was not intended for long firing sessions. The Star PD was not expensive but was feed reliable from the factory. The pistol fed most any type of wide mouth hollow point even though many factory loads of the time were not well designed for feed reliability.

The answer if you wished to carry these loads in a Colt 1911 was to polish the feed ramp, a job commonly known as throating. Many pistols were ruined by gouging into the feed ramp with Dremel tools, especially those pistols with aluminum frame ramps. On aside note many of these factory 45 ACP loads threw standard load procedure to the wind. These cartridges normally demand an overall length of 1.250" for feed reliability.

A short open mouth hollow point was counter productive even when the pistol featured the proper 1/32" gap between the two halves of the feed ramp. Some expanded well but did not feed well. Others only expanded if they hit a brick wall. I experienced a critical under-penetration with the Speer 200 grain Gold Dot, at the time the darling of the popular press. It expanded to 0.83 when dug out, sure, but stopped in heavy bone and mus- Far On the right is an original Star PD magazine.

STAR PD CONTINUED

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cle after four inches of penetration. The second necessary shot met less resistance. Many of us carried 230 grain hardball and I believe it is still a viable defense loading. The Star PD was manufactured from 1975 to 1990. It was difficult to Star PD Manufacturer Star Echeverria Eibar, Spain Type Locked breech single action Caliber 45 ACP Barrel Length 3.94 inches Weight 25 ounces Magazine 6 rounds find for some time and then became widely available by 1979 when I purchased my pistol.

The company, Star Bonifacio Echeverria SA, was headquartered in Spain. The pistol is basically a modified 1911 with the grip safety deleted. The pistol features a cocked-

and-locked type carry with a positive slide lock safety and bears much resemblance to the Browning High Power in design. The PD retains the barrel bushing of the 1911, albeit in much modified form. The Star PD features proprietary six-round magazines and does not accept 1911 magazines.

Originally supplied with a fully adjustable rear sight, later versions featured fixed sights more suitable for a concealed carry handgun. The frame is aluminum, making the pistol light. While longevity is another matter, although it may be argued the pistol served its purpose as a lightweight carry gun not intended to be fired often, the Star PD proved reliable in service. Proof the gun and carry it

was the rule. I handloaded my own ammunition for decades and this allowed a great deal of practice for a pittance.

The Star PD featured a well-designed recoil rod and spring that helped control the 25 ounce pistol's recoil. There is a plastic buffer as part of the design. At the time, the PD's recoil system life was five hundred rounds for the buffer itself and perhaps one thousand rounds for the recoil assembly. Replacements were readily available. As of this writing, I have found several recoil assemblies and buffers for sale at a reasonable price.

The buffer would begin to throw off shavings near the end of its service life ending up in the action. At this point the buf-



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fer must be replaced whatever the round count. I have examined a Star PD that had the appearance of a pistol that was fired a great deal. The owner had fired some 1,500 rounds over a period of two years, which is not a great deal of practice for modern shooters. He had never checked the recoil spring and guide. The slide was quite stiff on the frame when I stripped the pistol for inspection as the recoil spring assembly had completely eaten away the recoil buffer with a few shards of plastic was all that remained.

The recoil guide assembly had worn a trough in the aluminum frame of perhaps 0.015" in depth. Yet, the pistol still functioned. A new guide rod and buffer assembly was ordered and the pistol was sent back into service, with a warning to perhaps partially retire the pistol to less rigid duty—the owner had certainly gotten the measure of the piece by this time. The question of soft Basque steel has never been answered to my satisfaction.

A mentor remarked that the steel was fine but that the pistols were seldom heat treated properly.

STAR PD CONTINUED

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This was a rarity when introduced. He heat treated both Star and Llama self loading pistols with good results. The small parts take a beating in any compact handgun with a big cartridge and the Star PD is no exception. Every decade or so it was announced that the Spanish pistols were being built of good quality steel. On the other hand, I have examined vintage Astra 400 handguns that have the appearance of both fine material and craftsmanship. The Ruby and Llama are another matter!

As for the Star PD, inspecting the pistol isn't difficult and it takes down simply. First, remove the magazine and clear the chamber. With the magazine set aside, retract the slide and lock to the rear using the slide lock. You

may then use the take down slot by pressing the slide to the rear and locking the thumb safety into the slide. Press the slide stop out right to left as seen from the rear. Disengage the slide lock thumb safety and control the slide as it is run forward. Turn the slide assembly upside down.

A bit of pressure frees the recoil spring guide. A word of caution: the early model Star PD featured a two-piece guide rod that screwed together while later pistols differ and do not take the same type of plastic buffer. Regardless, I simply press the buffer off and replace it by pressing anew recoil buffer onto the guide rod. The trigger action is simple enough and never seems to give trouble.

Trigger compression on my example was a relatively smooth 7.0 pounds, average for the PD and common for single action pistols of the era. The pistol uses a simple trigger bar to trip the sear. I don't see any way to easily address the trigger pull and I would not on old steel and especially on a Star brand handgun. If the trigger bar had an obvious burr where it met the sear, perhaps, but otherwise leave well enough alone and let the pistol wear in.

Any Star pistols likely to come into the shop are as well worn as they are likely to become. This pistol was fired with 20 rounds of Black Hills 230 grain FMJ ammunition and proved reliable. Fifteen-yard five-round groups of three inches were average. AG

FROM THE ARCHIVE

Sales Practices

Practical advice on managing your gunsmithing shop and business.

BY BILL SMITH JANUARY 2023

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There are many skills and things a good gunsmith knows. This also includes non-gunsmith tasks and knowledge that can help your overall business. Parts Sales Gunsmiths are often a forgiving lot. We're prone to forgive silly mistakes that people make when they take their guns apart and then, because the gun fell apart easily, think they can get it back together again just as easy. It's easy to forgive when the mistake winds up earning us our reasonable shop fee.

Inevitably, the gun comes in and the owner is as much a basket case as the basket of loose parts that used to be their functioning firearm. It's likely either missing a small part, spring, or screw, or one of those were bugged up when our would-be gunsmith used the "any old screwdriver will work fine" that he grabbed from the junk drawer in the kitchen. Your now new customer asks you to put Humpty Dumpty back together again.

In doing so, you identify the missing part(s) that you were previously reassured were "definitely all there." You contact the King's Men about this and tell him so. No problem, he tells you he has a parts book and he will order in what's missing. What can you say? Say nothing but stop and think.

With a seemingly unlimited number of "how to" sources along with Internet access to parts supply, thousands of gun owners have been exposed to the availability of parts, instructions, and wholesale/dealer prices on everything from guns to accessories. The great majority of parts houses are in the book business. That may be fine for them but it doesn't help the gunsmith or gun dealer. Your customer can find the wholesale cost that you pay for everything and doesn't need an FFL or sales tax certificate to find out.

I'm an unabashed capitalist and have no problem with any person or company engaging in legal trade. A free market is the best way to drive a robust economy and provide the best opportunity for businesses and individuals. However, reasonable profits from the sale of parts should be part of our business. It is true in the automotive field that parts houses will sell to anyone who wants to buy components and fix their own car. The difference seems to be size.

Even something as simple as an oil and filter change is a bit of a hassle for the new would-be mechanic to crawl under their car without a mechanic's creeper, never mind a car lift or oil change pit that an auto repair or lube shop has. However, anyone with a kitchen table and a few random tools handy in the junk drawer can take a stab at firearm disassembly and attempt "gunsmithing." On one hand, this sort of thing ensures a supply of new customers.

I have no interest in profiting off of someone else's misery, but gun owners that realize they got themselves in over their head and bring in a bag full of parts that used to be a cherished firearm make good customers. I find the biggest issue with losing out on parts sales is the tendency to equate part wholesale cost to job cost. I've had more than one potential customer act as if I was a rip-off artist by suggesting that the job to install their wholesale-priced \$49.95 part should cost more than \$50.

Early on I stopped selling parts as retail items. When I order parts in for a job, I mark them up double if under \$10 and 40% on anything over. I also add in my actual shipping charge. Ordering parts takes as much effort as ordering any other inventory and you'd expect to make a profit selling that. If I can't make a profit on parts I

don't order them. If you have a lathe, mill, or other machinery and the skills to use it, you can use it to good advantage by making parts.

This likely makes sense for repairs requiring unavailable parts. You're essentially performing bespoke work and your customer either can't order in a part (wholesale cost or otherwise) or it's so ridiculously expensive on the used market that the repair justifies your hourly rate to make it. Discounts, Dealers, and Trivia Do not hesitate to give a discount to anyone who thinks he is entitled to one. You will soon learn who has the brass to ask for one.

Usually there is little justification for this request and usually it comes from someone who thinks that because he spent a couple of hundred with you or the guy who is buying and selling guns without an FFL (and there are thousands of them) and has given you three or four jobs they're automatically entitled. You should give genuinely good customers a discount. Why not? I consider discounts as public relations.

If one of your customers asks for more of your business cards because he gave away all that he previously had, he is really out working for you. You'd expect to pay something to run an ad. Offering a customer doing a good job in talking up your business is advertising. I consider a reasonable discount for such a customer the same as an ad fee. Plus, the good will is likely to incentivize him to think even better of your shop. Inflation is a monster but it does help justify small price increases at your business.

IF YOU ADD A MODEST

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price increase over time, offering your previous price to a great customer that sings your praises and brings in more jobs will be seen as your offering a discount. Consider work for something like a bluing job. You can keep your costs low due to using already paid for tanks. A small up charge more than covers any inevitable increases in salts, shop insurance, and the like. This is also an ideal type of job to offer volume discounts, such as on a single job involving multiple guns.

It's especially great for your devoted customer that convinces some of his friends to do a batch job. Police and military always seem to think they should qualify for a discount. Having an emergency responder discount is a good idea, especially for law enforcement as the department just may contract work out to you on the regular. Quote the "special police price" and let them know you have other discounts for volume work as well. Good will just might be useful in your getting a discount on a speeding ticket.

What about dealer discounts? Generally, I don't bother with a dealer discount and this includes bona fide gun retailers or any FFL holder. If a retail store does not have their own gunsmith it usually indicates that they do not have enough gunsmith work to pay the cost of one. These same retail stores will continue to advertise "complete gun repair" and then when a job comes in look for someone to do it on the cheap. I look upon these people just as favorably as I do any other customer.

They are going to get the best job I can do at the same price as anyone else and I do not put their work ahead of anyone else. To really convince you to cut a discount price to a dealer should require certain criteria to be met. A nice, well-placed sign in their store stating something like, "Authorized Agents for [Your Shop] Gunsmithing" with all of their repairs carrying tags stating your shop did the work would be the first criterion.

A written agreement that I was to take on all of their gunsmith work would be another. That ensures having full quality control, rather than having one botched job in one of their customer's hands done elsewhere which will get blamed on you as it's your gunsmith shop on the sign out front. If such a written agreement was arranged, I'd offer around a 10% discount to the shop, depending on job volume. If that doesn't seem like a big discount, consider that 10% is the average rate of return of the U.

S. stock market and about how much you'd expect a typical index or mutual fund to produce. That's good enough to allow any typical working person to retire a millionaire within a normal lifetime. If the taking in of a repair, writing up the tag, and calling the gunsmith isn't worth 10% of a job they didn't do, then don't do it for them. The 10% discount is almost a gift to them as it's essentially free money and you can rest assured the store will mark your charges up beyond that 10%.

I consider that as a discount advertising fee and insurance for steady work. Used Guns A customer comes into the shop and asks, "What have you got in a good 12 gauge?" I reply, "Nothing. They are all unloaded and empty." Ha, ha. Being more serious, I've found that gun people like to buy guns from a gunsmith.

The gunsmith can have a better selection, or at least a more interesting one, than the local big dealer because the gunsmith will buy and deal where the other guy is a little hard headed and has more costs involved in operating his store. Used gun sales are ideal for a gunsmith shop, much better than new gun sales. For starters, new guns area commodity item straight from the factory.

A brand new Glockinchester 56 in your shop is no better than the exact same model in a big chain store so the only thing you can compete on is price. And be-

cause they have much better buying power and inventory than you, you'll never beat them on price without taking a loss. For your customers wanting new guns, encourage them to ship them in to you from an online discount store or similar using your FFL.

They buy the gun with their money, pay for any shipping and taxes, and pay your reasonable FFL fee based on your normal hourly shop rate. Easy work for you and likely a good deal for them. Any inventoried guns in your shop should be used. Used guns are an imperfect market, and imperfect markets benefit the buyer or seller with the most information. As a gunsmith, that is (or should be!) you.

Unlike buying an inventory from a jobber, you can command the price (and your subsequent profit margin) upfront before laying out any cash. A gun owner looking to dispense with a used gun is likely doing so to make some quick cash and their only likely alternative to your shop is to pawn it. This also does your customer a service as they're at least getting a better price than they would otherwise. Any gunsmith shop retail sales are best served dealing, buying, and selling used guns.

It's also likely a used gun has some wear and tear and possibly needs repairs. Given gunsmithing work is done at a profit to the shop, you can repair and service a used firearm for much less than a potential seller can pay to have the job done. This adds in to your profit margin when you turn that gun around for sale.

Doing such work also benefits your future buyer as they know any used gun coming out of your shop is one that you've gone through, possibly refinished, and is a better buy because of your attention to what you sell. If there should be trouble with it they know you stand behind it and are able to correct any problem right away. The sign in your shop says, "Quality Used Guns For Sale", doesn't it?

SALES PRACTICES CONTINUED

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A gunsmith serving as a gun dealer exudes confidence because he is the knowledgeable one to properly value the used gun. Here again, the credibility you have earned will stand you in good stead and help sell a used gun. The intimacy that goes between you and your customer is something a discount store or online store can't match. Take advantage of it. Use the confidence and rapport between you and the customer that you have established.

Often times you can, through your knowledge of guns and experience with your customers, trade the sale up by showing something he will like even better. You also have to be able to do a mental biopsy of his wallet at the same time so that you don't make him feel like a fool for looking at a cheaper gun. You want the sale of one or the other so learn your customers quickly.

Above all, he has to feel comfortable with you and when he looks at a discontinued gun and makes the remark, "Boy, they don't make 'em like that anymore" don't answer him by telling him, "Nope, they realized the error of their ways and built a better one." Along with used gun sales, consider consignments. Rather like letting your customers use your FFL to ship in guns they pay for, consignments are another way to offer an inventory of items without investing your own money.

Customers that aren't keen on selling at a price that meets my desired mark up and aren't desperate for cash will often consider sale by consignment. One down side is you have to secure consignment items in your shop but I don't consider this excessive risk. You have much more invested in your shop given the tools and everything else so you need to carry insurance against loss due to fire, theft, and the like. Adding some consignment guns to your existing inventory is hardly any real added risk.

Consignments also require carrying an inventory. The customer using your FFL for a fee is ordering in exactly what they want

before you have to handle it so you're reassured (usually) someone will pick up shortly after it arrives. With a consignment, you have no way of knowing for sure when or if it will ever sell. If you're smart and know your local market, you should have a good idea if it will, but that is never a guarantee. I still consider this reasonable.

With an inventory of new guns, I'm putting up my own money for items I have to insure and secure while hoping someone buys. With consignment, at least the inventory costs my shop nothing up front. Around 20% or so for a consignment on a fairly marked item is reasonable. You'll never make as much on consignment as you can on used guns but they add to your overall inventory. In addition to the greatly improved profit margin with much less invested up front, used guns offer a buying experience unique to your store.

Selling new guns is like stocking boxes of widgets with identical commodity items. A given new gun in your store is no different than that same model in everybody else's store so competition is limited to a race to the bottom of pricing and anyone with a smart phone can immediately find out how prices compare. Your inventory of used guns is unique to your shop. This is especially true of customized firearms and older guns no longer in production.

Unlike a shelf full of toasters, that one gun a customer in your shop is now keen on might not be readily available just anywhere. And, with a rotating inventory of used and consignment guns, the only way your customers will know what you currently have is to check in regularly. Your good customers will also let you know about any particular firearms they're interested in, which can allow you to make quicker turn around on sales when the right gun crosses your shop.

One of the great dangers in buying used guns is buying something you like but the sales are slow. You need to understand

your local market as well as your personal interests. If you want to buy something for yourself, by all means do it, but don't build an inventory based on guns you like—deal in guns that you know sell well locally. I know this all too well. I once bought a 11.2 x 72 Schuler Mauser one time.

I never took it to Africa but I shot hell out of a moose with it and then realized that what I had was largely a conversation piece, ammo was hard to find, it kicked like hell, and I just wasn't going to use it much. I sold it with no regrets and bought a M70-375 which makes more sense and have since shot everything from antelopes (African) to buffalo (American and African) with it. I got my kicks buying the Schuler and got my kicks selling it.

While I am on this subject, let me say it is great to own and shoot a great many different rifles, shotguns, and handguns. Our love of guns is why we became gunsmiths so it only makes sense to want to shoot and own as many as we can. It's part of the learning and development process. However, as I've grown older (and hopefully wiser) I found most of my gun accumulation (it would be overly generous to call it a "collection") sat in the safe while almost all of my shooting is done with a small number of guns.

You can only shoot one gun at a time and rarely take more than one on a hunt. I've found my shooting and hunting is more enjoyable by trying to get better with a few guns. One or two suitable rifles to hunt with, which double as match rifles at the occasional local Sporting Rifle or Hunter Shooter event. Add in a shotgun for birds and maybe Trap along with a handgun and that occupies well over 90% of my shooting.

You pick what you actually use regularly for the type of shooting and hunting you do and you will be just as happy with far less hassle and cost. AG

MAINTENANCE & REPAIR

Modular Pistol Sights

A history of the development and current state of modular sighting systems for handguns.

BY AMERICAN GUNSMITH EDITORS JANUARY 2023

ORIGINAL PP. 18-22

Have you ever heard the term “rooney gun”? It’s sort of a slur toward competition-only firearms and equipment that allegedly could never be useful in the real world. It’s usually uttered by folks maintaining that back in the good ol’ days, when things were right and pure, shooting held a real world emphasis and participants only used true and proper shooting gear. Nobody tried “to gain an edge by any means” like those conniving competitors and their fake equipment today. It turns out this is not quite true.

When practical shooting was in its infancy in the late 1950s, there was no competition-specific gear for it. Over time, top competitors began learning what techniques, training approaches, and equipment worked best by looking to the winners. By the end of the 1950s participants began using competition-specific guns and gear. The 1911 began surfacing as a dominant platform but the as-issue gun didn’t always have the nicest trigger or adjustable sights as found on revolvers.

They also sometimes exhibited less-than-stellar reliability with anything besides military. Early practical competition shooters added revolver sights to their automatic pistols and used custom holsters inspired by Fast Draw. Both are 1950s era competition equipment from Jeff Cooper. While it was not standard issue at the time, this experimentation would create positive changes in factory and standard issue offerings. round nose ammunition.

Competitors took their Government Model handguns to custom gunsmiths to retrofit adjustable revolver sights and have trigger and action jobs done. None of this was found on actual carry guns of the day, military or police, but competitors did it to gain an edge. Early competitors noted that merely having a handgun reliable enough to complete a match without a malfunction was a big advantage.

Combat shooters of the 1950s and 1960s were using “rooney guns”, that is, firearms modified with the best-known modifications of the day and intended to win competitions, demonstrating what refinements did prove reliable and useful. Most of these have since found their way into readily-available aftermarket accessories and into factory production guns. This was also true of accessories such as holsters as well.

International Practical Shooting Confederation, United States Practical Shooting Association, and International Defensive Pistol Association events all use belts that fit through the regular trouser belt loops because of the common use of “rooney” gun belt holsters influenced by competitive Fast Draw, a sport that had its heyday at the same time practical shooting started.

In fact, the very first practical shooting competitions organized by Jeff Cooper at Big Bear called Leatherslaps were influenced by and marketed around the Fast Draw and cowboy/wild west chic popular at the time. Among his many credits, famed shooting innovator and Precision Pistol competitor Gil Hebard was Far As the name implies, the tube can not be seen through.

MODULAR PISTOL SIGHTS CONTINUED

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USAR Shooting Team member Joe Pascarelli used an Aimpoint on his handguns to win the Pistol Nationals at Camp Perry in 1979. Speed shooters would realize these sights were also fast when Jerry Barnhart used one to secure the USPSA Nationals ten years later. They weren't very durable at first, the first to introduce optical sights to pistol competition. Burris offered their Bullseye Pistol Scope in the 1960s with a large dot reticle and either no magnification or 1.7X.

One of the first notable reflex sights was the Single Point Occluded Eye Gunsight. OEGs do not have a lens in the tube to see through and require users to keep both eyes open. While maintaining focus on the target with both eyes the aiming eye sees the dot inside the OEG tube and the superimposed red dot is used for sighting. This scope was used with the then new CAR-15 Commando (XM177/ GAU-5 series) carbines during the Son Tay Raid in 1970.

In 1981 Armson released a tritium-illuminated OEG similar to the original but with more robust features and a variety of mounting systems for popular rifles and shotguns. In 1974, a small group of Swedish entrepreneurs started exploring ways to create a similar sighting technology that would allow shooters to acquire their target quickly like the OEG while being able to see through the tube.

In 1976, United States Patent 3,942,901, "Optical sighting instrument with means for producing a sighting mark", was awarded to the company that would become Aimpoint. The abstract reads that their invention is an optical instrument comprising a concave lens with a light-reflecting surface and a light source. The lens allows observing the target while reflecting a dot of light appearing to lie far in front of the mirror to serve as a sighting mark on a line between the observer's eye and a target.

Aimpoint's first commercial sight product, the Aimpoint Electronic, was introduced to the market and proved successful. A number of companies began following suit on the concept and refinements started to be offered. Ultradot followed with less expensive copies of the Aimpoint and started to gain traction in Precision Pistol in the 1980s as their price point was good along with sufficient reliability.

The Florida-based Tasco offered an affordable and well-made Japanese manufactured sight as the Pro Point that proved a tipping point for red dot optic popularity. While the original Aimpoint design utilized a full tube to house the lens and controls appearing similar to a "normal" optic, this is not necessary. Unlike scopes, red dot sights only need one lens. C-More Systems were the first to offer tubeless sights with a single open lens atop the controls, emitter, and mounting hardware.

In theory this more open design gives the shooter a wider field of view. Miniaturization of this idea has allowed the concept to be used on ever smaller units. Tasco released the Optima 2000 in the late 1990s, one of the first of the ultra-compact red dot sights. Product improvements on this concept, primarily ruggedization, were released in the form of the Docter USA and JP Enterprises Jpoint models.

One of the current best releases of the miniature models is the Insight m RDS (mini Red Dot Sight), a fully mil-spec unit that is waterproof, shock and drop proof, is usable with night sights. Far Modern versions are as durable as iron sights and a single AA battery provides tens of thousands of hours of constant-on power. Red dots need a lens to work but not necessarily a tube. C-More Systems was among the first to offer a tubeless optic.

Red dot sights can be used on any number of firearms, including this FN MAG (M240).

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85 ounces. Far and naked vision, Picatinny/M1913 rail mountable, yet only weighs 0.85 ounces. The original Aimpoint design used a battery-powered red LED to emit a light seen as the red dot reticle reflected on the internal lens. Other light sources used include fiber optic light collectors and tritium capsules. Others were designed for use with night vision devices and other light colors such as green are available. Reticle shapes are not limited to dots.

Any shape reticle image can be designed to reflect on the lens and some sights use a chevron or triangular pattern. An optic, magnified or not, offers advantages over iron sights for precision shooting, especially given the relatively short sight radius on handguns. It's a myth that reliability is unimportant in Precision Pistol (Bullseye) competition.

Competitors are allowed only one alibi per stage (a 900 aggregate has four: Slow Fire, National Match Course, Timed Fire, Rapid Fire) and an alibi target scores the worst ten shots. However, reliability is more forgiving than the no-alibi format in other disciplines. As red dots proved more reliable

they became popular on pistols for the Bianchi Cup, which the National Rifle Association would later purchase the rights to and call Action Pistol.

When first used in bullseye and then the Bianchi Cup in the late 1970s and early 1980s, they were so new and "space age" to be taken seriously. People surmised they were also slow, until Jerry Barnhart used an optic to win the USPSA Nationals in 1990. This would also lead to the creation of stock class in USPSA, formally called Limited, that disallowed such modifications, as well as IDPA to avoid race gun modifications altogether.

After competition shooters beat them up enough and manufacturers eventually learned how to make them robust, military and law enforcement began using these sights on long guns. While still too bulky for handguns, the 1990s-era Aimpoint proved reliable enough for military use in the form of the M68 Close Combat Optic. For those with concerns about optics as general issue sights, read "Do D Small Arms Repair Technician" by Steph Martz in the April 2019 issue.

Quick review: modern optics are typically more robust and require less maintenance than iron sights. Another improvement to the sights was miniaturization. Docter Optics (now Noblex) in Germany was one of the first companies to offer a micro red dot sight small enough to fit on the rear of a pistol slide. Excluding the necessary screen for the red dot to project on, the sight was not much bigger than a Bomar or similar quality adjustable rear sight.

IPSC started offering different equipment divisions around the same time USPSA did. Like IDPA, they used a box with specific dimensions that a Standard division (stock class) handgun had to fit. Of course, the anything-goes Unlimited or Open division guns didn't have to fit. IPSC also offered an interesting third option called Modified which allowed modifications similar to Unlimited/Open but it had to fit the same box as Standard.

With micro red dots now small enough to slide mount, they became a fixture on IPSC Modified guns.

MODULAR PISTOL SIGHTS CONTINUED

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One gun can now be configured for numerous different shooting applications and competition disciplines. I've always maintained that if you want to see what progressive, cutting-edge tactical trainers will be using for equipment and technique five years from now, see what is used by winning competitors today. This is yet another example. This technology can be had on real world handguns. Tactically-minded shooters started experimenting with this equipment on duty pistols.

While the first tube sights weighed around a pound, these micro red dots weigh a few ounces. With an optic, there is no sight radius and no accuracy benefit from having a pistol with a longer slide. Custom slide milling and optic cuts for popular service handguns such as Glock, Smith & Wesson, Heckler & Koch, SIG Sauer, Canik, Springfield and the like started to become available. In the last several years red dot sights have improved in their availability, durability, battery life, and usability.

Some police departments have begun issuing handgun red dot sights already and the military is following as well. As it became known that the winner of the XM17 Modular Handgun System was the SIG

Sauer P320, the U. S. Navy procured 60,000 units as well as awarding Trijicon a contract for their miniature reflex sights. The M17/18 are optics-ready out of the box. Of course, we have over a century of available service handguns when iron sights were the only option.

Dan Behymer of US Precision Defense (USPrecisionDefense.com), offers some advice on this transition. Here are the basics. Iron sights are still viable and remain ideal for many applications. Given that an optic reduces error from sight misalignment, which becomes less noticeable to the iron sight shooter as the sight radius shortens, engaging at 100+ yards is a real option with a firearm traditionally considered to have a maximum effective range of 50 yards.

Although the price point has dropped as reliability has increased, it's still more expensive, especially compared to fixed iron sights. For personal defensive use, the majority of incidents at one or two dozen feet away or closer so this capability is not as useful. Tall iron sights as a back up are an option and it depends on shooter preference. Obviously, for Carry Optics division

or other range use there is no need; a sight failure costs you some stage points at worst.

Many recommend them for duty use in law enforcement or military scenarios. A good recommendation is to measure and fit the sights to your slide that have a 1/3 co-witness so they don't completely block your sight picture but are there for emergencies. It truly depends on what the intended use of the pistol is going to be. It's worth noting again that current red dot sights, including micro sights that ride a handgun slide, are proving as reliable as iron sights so even that doesn't have to be a hard rule.

Generally, there are two sizes of red dots sights. There are the full size (but still small) units like the Trijicon RMR, Shield RMS, Holosun 507c, Swampfox, Vortex, Venom, and similar. The other are micro dot sizes such as the SIG Romeo Zero, Holosun 507k, Trijicon RMRcc, Shield RMSc, and others. They all have their place but it's recommended to use the larger optic if it will fit.

A good reference point is that if the magazine is double stack you can go full size; if it is single stack then a micro is recommended. Some pistols

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like the Springfield XD are full-size but are limited to the micro due to placement of the firing pin blocker pocket and the extractor pocket. At first, the only option was custom work to modify cuts on the slide to mount an optic. This made things more compact than the previous method of adding a rail the length of the slide (common for Wad guns in Bullseye) or adding amount to the frame (common on Unlimited guns in action shooting). The benefit of modifying the slide is a sleeker profile for the optic.

Manufacturers later began adding adapter plates to factory offerings. This was necessary as mounting differs between optics, such as screw locations. Cutting the slide rather than using an adapter plate saves weight and with the cut the balance stays relatively the same. The disadvantage is any custom work is more expensive than an available factory option and any machine work makes it impractical to go back or to use a different mounting pattern without careful welding and machining.

The one big disadvantage to both custom machine work and factory pre-cut slides and mounting plates is their permanence. For years, long guns have offered modular mounting options in the form of Picatinny, Modular Lock (M-Lok), and Key Mod. Sights and accessories can be added and removed easily. Nighthawk Custom and

Accuracy Know offers these kind of options on handguns. Nighthawk Custom (Nighthawk Custom) offers their Interchangeable Optic System.

This utilizes removable plates that allow the shooter to switch from standard iron sights to a variety of red dot sights in less than 30 seconds while holding zero. The IOS makes one handgun adaptable to any number of uses, allowing for multiple low profile sight mounts that can be readily switched out. The dovetail cut in the slide each plate can be removed and still return to zero, allowing for quick and easy switching of the rear sight without sacrificing aesthetic or function.

The IOS is available for new builds or existing 1911 handguns, both from Nighthawk Custom and other manufacturers. Users switch plates by untightening a screw on top of their iron sights plate, releasing the retaining pin. The retaining pin can then be pushed out of the side of the plate, allowing the plate to slide off the back of the firearm. Then, slide on the plate with a different sight, insert the retaining pin, and tighten the screw.

The tapered dovetail cut provides a large centering surface to maintain rear sight alignment. Accessory mounts accept plates for the Trijicon RMR, Trijicon SRO, Shield

RMSc, or Vortex Viper. The optic system is cut low in the slide so that regular height front sights can be used instead of tall suppressor sights like most other mounting systems. Also a modular design, Nighthawk Custom also offers the Dropin Trigger System.

Designed by Mark Dye, Director of Gunsmithing Programs Montgomery Community College, the DTS is an all-in-one unit replacing the existing hammer, hammer strut, sear, disconnector, and sear spring. Your existing sear pin and hammer pin will be retained for use with the DTS, but no other parts are necessary for installation. With a steel housing securing the unit, the internal parts are machined from bar stock 416 stainless steel.

The traditional three-pronged sear spring is no longer necessary as the springs for the disconnector and sear are built into the unit. A single-leg grip safety spring is included with the DTS to replace the existing sear spring. No bending or tweaking of sear spring legs is necessary to try to tune the pull weight. Since the unit is self-contained, the DTS is in control of the critical hammer/sear pivot pin placements and diameters.

The DTS works with 1911 models in Series 70, Series 80, and Swartz Style, as well as 2011 models.

PEOPLE & COMPANIES

Reader Forum

BY AMERICAN GUNSMITH EDITORS JANUARY 2023

ORIGINAL PP. 23-24

T/C Contender I have been working on a Thompson Center Contender. When a barrel for a straight wall cartridge such as 44 Magnum is installed on either of my two frames there are no issues, however, when a barrel for a necked cartridge such as 222 Remington or 30 Herrett is installed I'll experience one or two misfires for every eight to ten shots. This only happens with bottlenecked cartridges and when they fail to fire the primer strike appears no different than those that do fire.

Any guidance on a potential solution is greatly appreciated. Author Lowell Kenney (Eagle View Arms) replies. Straight walled cartridges headspace off the rim as do 30-30 WCF and other older cartridges. Necked cartridges headspace off a datum on the shoulder of the case. If you chamber the rimless cases flush with the rear of the barrel, you have not accounted for the space between the frame and iron sight options, the Reflex Sight Module mounts Vortex, Leupold, C-More, Trijicon, and other red dot sights.

These can include back up iron sights. The SLOT Sight at the slide's front provides the same option for front sights. The Multi- Sight and SLOT Sight can also be used a variety of full-length rail options. This includes Picatinny the barrel, thus you have too much headspace for dependable functioning. When I barrel a Contender or an Encore action, I do my best to have that space at 0.003" or less. Many factory barrels gap in this area at between 0.010 and 0.020".

You can check this gap with a feeler gauge, starting with a stack of blades that will easily pass between the barrel and the frame. Keep adding blades until the stack won't pass through, add up the total units of the blades, and simplify the stack to have the same thickness with fewer blades. Fiddle with this type of mea-

sure until you can get the same measurement in several ways. That is your headspace for that barrel and frame. This must be done for each frame and barrel combo as they all will be different.

Frank Masick Albia, IA On the cartridges that did fire, neck size those cases when reloading them without pushing the neck back. I usually only neck size 3/4 of the neck, just enough to hold the bullet firmly. This is also great for having along life on your brass. Check the length of your brass and Rail Modules available in 2, 5, and 6-inch lengths and micro Rail modules designed to mount Aimpoint Micro and similar sized sights.

What started as competitiononly, unrealistic, "rooney guns" only suitable for range use have now become real, practical, durable, issued equipment. Ain't progress grand? AG trim when needed and move your should back a bit. This works for safe and standard loads, however, if you insist on loading "slappin' shoulder blades, false teeth ejection" loads, then please follow other directions.

Tuning Ruger Single Actions I read "Tuning Ruger Single Actions" (September 2022) by Dan Croghan and Gary Yee and found it to be very good coverage on tuning these revolvers. The disassembly coverage also works for .22 rimfire single action revolvers as well, although these revolvers are not an exact copy of the Blackhawk or the Vaquero. The part list for the 22 revolvers does list an extra part called a spacer. The spacer installs onto the trigger pivot pin between the trigger and the outside wall of the frame.

Upon removing the trigger pivot pin, the spacer will likely drop down into the frame. It's easy to drop the spacer out of the frame and possible to lose it. Use a magnetic screwdriver to hold the spacer in place upon assembly and

READER FORUM CONTINUED

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install the trigger pivot pin onto the frame. The spacer just hangs down on the trigger pivot pin into the frame. The frame is upside down for this operation of assembly. I think Ruger has a winner with this 22 single action revolver. It appears to be a durable and reliable with a very reasonable price point but isn't a fancy target shooter.

I understand Ruger has set up the machinery making it out of raw steel which goes into one end with fully machined parts coming out the other with almost no hand fitting done during assembly. I've found they shoot well right out of the box but some TLC is needed here and there, the sort of thing to get any firearm to become a nice shooter. I was not happy with mine until I worked on it.

I have included shooting live ammunition out of all 22s as part of my standard inspection, however, because I'm not tuning match guns I normally don't bother with a bore alignment check provided the group size is reasonable. I have found the chambers in the cylinder as being tight with some cartridges not dropping in fully. I think it useful to test a variety of different kinds of ammunition to find out which your particular firearm likes best.

Following instructions in the article on polishing the chambers concerning large caliber cylinders, I found a shop-made tool made of a hardwood dowel to polish

chambers works well. While I've polished and checked chambers in different revolvers, I typically find that it is not necessary to do this. Out of the box I've found many revolvers tend to shoot low at around 25 feet and I understand this is fairly common, especially with 22 rimfire single action revolvers.

A careful filing on the top of the front sight will help get a better point of impact and the key is to go slow and check often. I've found no adjustment is typically needed for windage. These revolver sights are simple and cheap which helps keep the price point low but you do need to understand the basics of how they work to adjust them. As with everything there is a learning curve, especially when doing trigger and sear work.

It is easy to mess these parts up; standard disclaimer here, only proceed if you have experience working on triggers. To stone or polish the trigger and hammer sear surfaces use about 1/4 to 3/8 of an inch long strokes on the surfaces. This will help the sear surfaces stay flat and level and square with the world. As you make a stroke your arm tends to move your hand in an arch along the sear surface.

Of course, this is a no-no so you need to go slow and careful and ensure that the sear's surfaces remain absolutely square. If you do get an arch or rounded surface this

will reduce sear contact and will create an unsafe trigger. Go too far and you'll have a too-light and unsafe trigger and end up having to replace it with new parts. I do like to finish up one sear's surface with wet or dry sandpaper at 320 grit with a solid backing and finish up the other surface with 400 grit.

If trying for a very light trigger pull I use 400 grit and 600 grit instead. I also recommend using Gun Slick grease from Brownells on the sear surfaces. This helps give a smoother trigger pull as the surface is finished with a heavier grit better holds the lube in place for a smoother contact between surfaces. My 22 Ruger revolver did not get a trigger overtravel adjustment.

On a revolver with a half cock notch a trigger overtravel will likely mess with the trigger engagement into that half cock notch on the hammer. My revolver has a trigger pull of about 3 lb. 2 oz. which is very nice as far as I'm concerned. One last note, I have had to replace the safety transfer bar on a couple of other Ruger revolvers in order to get a smooth trigger pull done. Daniel P. Horn Wolsey, SD Authors Dan Croghan and Gary Yee reply. Thanks for adding this, Mr. Horn!

We're glad you found our article good and appreciate you sharing this useful additional information. AG

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