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INSIDE THE ARCHIVE

RUGER GP100 OPTIC

STATISTICS VS. GUN CONTROL • THE FUTURE OF THE PAST • CORROSION RESISTANCE • MOSSBERG MVP MAINTENANCE

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 219

DIGITAL ARCHIVE EDITION

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FROM THE ARCHIVE

Statistics vs. Gun Control

BY AMERICAN GUNSMITH EDITORS MARCH 2022

ORIGINAL PP. 2

Leah Libresco is a statistician, former newswriter for the data journalism site Five Thirty Eight, and Yale alumna. Despite holding anti-gun opinions, she decided to let data drive her study results rather than emotions. Here is what she learned. “Before I started researching gun deaths, gun-control policy used to frustrate me. Then, my colleagues and I at Five Thirty Eight spent three months analyzing all 33,000 lives ended by guns each year in the United States, and I wound up frustrated in a whole new way.

We looked at what interventions might have saved those people, and the case for the policies I’d lobbied for crumbled when I examined the evidence. The best ideas left standing were narrowly tailored interventions to protect subtypes of potential victims, not broad attempts to limit guns. “I researched the strictly tightened gun laws in Britain and Australia and concluded that they didn’t prove much about what America’s policy should be.

Neither nation experienced drops in mass shootings or other gun related-crime that could be attributed to their buybacks and bans. Mass shootings were too rare in Australia for their absence after the buyback program to be clear evidence of progress. And in both Australia and Britain, the gun restrictions had an ambiguous effect on other gun-related crimes or deaths. “As my co-workers and I kept looking at the data, it seemed less and less clear that one broad gun-control restriction could make a big difference.

Two-thirds of gun deaths in the United States every year are suicides. Almost no proposed restriction would make it meaningfully harder for people with guns on hand to use them. “The next-largest set of gun deaths—1 in 5—were young men aged 15 to 34, killed in homicides. These men were most likely to die at the hands of other young men, often related to gang loyalties or other street violence.

And the last notable group of similar deaths was the 1,700 women murdered per year, usually as the result of domestic violence. Far more people were killed in these ways than in mass-shooting incidents, but few of the popularly floated policies were tailored to serve them. “By the time we published our project, I didn’t believe in many of the interventions I’d heard politicians tout.

I can’t endorse policies whose only selling point is that gun owners hate them; policies that often seem as if they were drafted by people who have encountered guns only as a figure in a briefing book or an image on the news. “I found the most hope in more narrowly tailored interventions. Potential suicide victims, women menaced by their abusive partners, and kids swept up in street vendettas are all in danger from guns, but they each require different protections.

We save lives by focusing on a range of tactics to protect the different kinds of potential victims and reforming potential killers, not from sweeping bans focused on the guns themselves.”

METALWORKING

Ruger GP100 Optic

Here's how I installed a "no drill-no tap" mount and handgun scope on a Ruger GP100 revolver to improve my accuracy.

BY GLEN CALVERT MARCH 2022

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I have a stainless steel Ruger GP100 chambered in 357 Magnum with the six-inch barrel. The iron sights are fine but I wanted to shoot more accurately at longer distances. I decided to add along eye relief scope to improve my accuracy beyond 25 yards. For those not familiar with the GP100, here's a little background. The GP100 is a family of double action revolvers that succeeded the

Security Six series. Ruger strengthened the frame and action; the cylinder is locked into position at the front, rear, and bottom.

The GP100 is available in several calibers, barrel lengths, and in blued or stainless steel. My GP100 weighs 48 ounces loaded with the ammo used in the test. The single action trigger pull averaged 4.5 pounds and the double action pull was 10.7 pounds. It has the Hogue grip which reduces felt recoil. After some searching on the Internet, I found the

"Weig-a-tinny" scope mount made by Weigand Machine and Design (Jack Weigand.com) intended for the Ruger GP100.

The mount accommodates Weaver and Picatinny scope rings and is available for the GP100 with 4", 4.2", and 6" barrels. It's aluminum, weighs 3.1 ounces, and ships with the required hardware. The mount utilizes the GP100 front The machining quality is excellent.

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and rear sight mounting locations and does not require any modifications to the revolver. Installation The front and rear sights are easily removed. The front sight has a springloaded pin in its base; push in on the pin, lift the rear of the sight blade and pull it to the rear to disengage the lip at the front. The rear sight has across pin that is drifted out, right to left. Turning the elevation screw counter-clockwise on the top of the sight allows it and the sight to be removed.

There are two springs under the sight; be sure to capture them. I clamped the pistol frame in a soft jawed vise after removing the grip so I could have both hands free. Weigand provides an excellent set of instructions and I'll cover the main points. The scope mount utilizes a small steel block that fits into the

front sight location and is retained by the spring-loaded pin. The block has two tapped holes that secure the front of the mount.

The rear of the mount is secured by a screw inserted into the rear sight elevation screw hole. The tapped holes and the screws need to be degreased before assembly. The rear sight notch acts as a recoil lug so the scope mount is pushed and held forward against the notch and the rear screw and washer are installed first. Use thread locker and tighten the screw until snug and then back out 1/4 turn. The two front screws are installed with thread locker, tightened until snug and then backed out 1/4 turn.

These screws are then tightened until snug, and the rear screw is snugged down. Tighten the screws to 20 inch-pounds or about another one-eighth of a turn. The rear screw is 6-

40 thread, and the front screws have 6-48 threads and require 3/32" and 7/64" hex head wrenches, respectively. The rear screw is longer than the other two and careful inspection is required to ensure it doesn't protrude into the cylinder opening. If it does, it will need to be shortened.

The mount should not touch the barrel other than at the front block. I checked the fit up of the parts before adding the thread locker. There were no issues and the installation was easy. Weigand recommends checking the screws for proper torque after 12 rounds and again after another 12 rounds and then after every 50 rounds for 150 rounds. After installation, the mount was very solid. Weigand offers scope mounts, both drill & tap, and no drill-no tap for a variety of handguns. There are

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Spring loaded pin is pushed rearward to release sight blade, sight blade is lifted at rear and pulled rearward. The original ramp sight blade was replaced by the light tube shown. Drift out the cross pin, right to left, turn elevation screw CCW to remove it. Be sure to capture the two springs under the sight assembly. The tapped hole needs to be degreased. "mini-mounts" for Ruger revolvers that position red dot on top of the frame. The machining on the mount was excellent.

At the Range I wanted to determine how much I could improve my longer distance shooting with optics. I had depleted all my 357 Magnum rounds and most of my 38 Special awhile back and had not restocked. Ammo is starting to become available again, however, 357 Magnum ammo was not to be found anywhere and the 38 Special selection

was very limited. I used a 38 Special load with 158 grain full metal jacket round nose bullets for all the tests.

Obviously, I wanted to see if the scope mount stayed firmly attached with 357 Magnum but that will have to wait until another time. The mount screws did not loosen during the tests so I doubt there will be an issue later. When shooting rifles, I typically shoot four groups of five shots and average the groups. More recently, however, I have been shooting three groups of three shots due to the lack of reloading supplies. I decided to fire three groups of three rounds at each target for this test to conserve ammo.

I fired all the rounds in single action. I initially documented my accuracy with the GP100 at 15, 25 and 50 yards with the iron sights.

The barrel was supported by an adjustable rest and the butt of the revolver sat on a rear bag for all the tests. The groups averaged 1.73", 3.01", and 7.84" at those distances. After installing the scope mount, I decided to try a Bushnell TRS-25 red dot first since it had improved my accuracy at longer ranges on a rimfire pistol, especially when shooting offhand.

The red dot eliminates the need to align the front and rear sights with the target. After sighting in, I shot groups at the same distances. Those groups averaged 1.45", 2.81" and 5.49". There wasn't much difference at 15 and 25 yards but some improvement at 50 yards.

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I then installed a BSA Edge 2-7x32 pistol scope. I chose this scope based on the price and favorable reviews. It weighs 10.7 ounces and the quick detach rings added 6 oz. I sighted it in and then shot groups at 15, 25 and 50 yards. The groups averaged 1.41", 1.72", and 3.55". This was a 43% improvement at 25 yards and a 55% improvement at 50 yards when compared to the iron sights.

There was no real difference in group sizes at 15 yards which is not surprising at such close range as even the scope's 2X setting was too

much magnification and the red dot was easier to shoot at that distance. The vertical and horizontal lines on the scope reticle were narrower than the red dot and helped me zero in on the center of the targets. I noticed that the field of view on the extended eye relief scope was smaller than with rifle scopes which I assume is typical.

Shooting with both eyes open helped, as it did with the red dot. I shot offhand after each of the accuracy tests. The red dot and mount added six ounces to the GP100 which wasn't

really noticeable. The scope and its mounts added 16.7 ounces, turning a 3 pound handgun into a 4 pound handgun. That was noticeable. I found it easier to hold the gun on target with the red dot due to the lighter weight.

The GP100 is capable of better accuracy, the bench rest and the offhand shooting revealed that I need to spend more time on dry fire and live ammo drills. I'll try different ammo, including 357 Magnum, when it's available.

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Ruger GP100 (Specifications subject to change without notice) 1 Barrel 2 Center Pin Lock 3 Center Pin Rod 4 Center Pin Spring 5 Crane & Crane Pivot Assembly 6 Crane Latch Pivot 7 Crane Latch Spring Plunger 8 Crane Latch Spring 9 Crane Latch 10 Crane Pivot Lock Plunger / Spring 11 Cylinder 12 Cylinder Latch Pivot 13 Cylinder Latch Plunger 14 Cylinder Latch Spring 15 Cylinder Latch 16 Cylinder Retaining Ball (2 Req'd) 17 Disassembly Pin 18 Ejector 19 Ejector Alignment Pin (2 Req'd) 20 Ejector Retainer 21 Ejector Rod 22 Ejector Spring 23 Firing Pin Rebound Spring 24 Firing Pin 25 Front Latch 26 Front Latch Pivot Lock Spring Optics don't necessarily make you shoot better; they help you see better.

This allows you to be more precise in your shot placement.

The "Weig-a-tinny" scope mount was easy to install and provided a very 27 Front Latch Pivot Lock 28 Front Latch Pivot Pin 29 Front Latch Spring Plunger 30 Front Latch Spring 31 Front Sight - Front Sight Cross Pin, NI 32 Front Sight Plunger 33 Front Sight Plunger Spring

34 Grip Ferrule, Left 35 Grip Ferrule, Right 36 Grip (One Piece) 37 Grips 38 Grip Panel Locator 39 Grip Panel Screw 40 Hammer 41 Hammer Dog 42 Hammer Dog Pivot Pin 43 Hammer Dog Plunger 44 Hammer Dog Spring 45 Hammer Pivot Assembly 46 Hammer Strut 47 Hammer Strut Mainspring 48 Hammer Strut Seat 49 Pawl 50 Pawl Plunger 51 Pawl Plunger Spring 52 Rear Sight Complete 53 Rear Sight Base 54 Rear Sight Blade 55 Rear Sight Cross Pin 56 Rear Sight Elevation Screw 57 Rear Sight Elevation Spring (2 Req'd) 58 Rear Sight Windage Adjusting Screw 59 Rear Sight Windage Spring 60 Recoil Plate 61 Recoil Plate Cross Pin 62 Transfer Bar 63 Trigger 64 Trigger Guard 65 Trigger Guard Latch 66 Trigger Guard Latch Pin 67 Trigger Guard Latch Spring 68 Trigger Link 69 Trigger Link Pin 71 Trigger Pivot Pin 72 Trigger Plunger - Safety Insert, NI (Plastic Disc) solid base for attaching optics to the GP100.

It is well made and is not expensive. Installing the red dot and scope helped improve my accuracy at longer distances. They'll probably help your customers as well. AG

FROM THE ARCHIVE

The Future of the Past

Some of the best designs in the gun world today are firearms first released over a century ago. Many professional gunsmiths specialize in these classics. Over a hundred years old, the 1911 remains a high performance standard.

BY OSIRIS CARTER MARCH 2022

ORIGINAL PP. 8-9

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It was an amazing year to say the least! In January, the world saw the first shipboard landing of an aircraft. In May, the first Indianapolis 500-Mile Race had revved up cars blazing around the track, with the winner having an average speed of a whopping 74.6 miles per hour! In July, American explorer Hiram Bingham discovered Machu Picchu, the Lost City of the Incas. But more importantly than all of these events and dozens more, the most significant event to occur in the year 1911, transpiring in late March.

The Colt pistol, designated “Model of 1911,” was adopted by the United States Army. Over 100 years later, this iconic pistol continues to “keep em’ in the 10-Ring!” With such an amazing start, the future of the 1911 looked bright. John Moses Browning, often hailed as the father of modern firearms, designed the 1911 pistol to operate off of a recoil operated slide and chambered in the venerable 45 ACP round. Throughout much of the history of the 1911, not much has changed design-wise.

The grip angle has remain unchanged, single stack magazines have prevailed, and the slim profile has continued to dominate. As an avid lover of the 1911 platform, the consistency of the effectiveness of this firearm reminds me of an age-old adage my sweet grandma used to tell us growing up: “If it ain’t broke, don’t fix it.”

More than a century later, and thousands of different firearms being introduced to market, the 1911 has sustained its dominance.

Between 1911 and 1983 very few changes to this machine were introduced. And for good reason! If you’re going to change something, it should most definitely be changed for the better. In the early 1920s changes such as a shorter trigger, frame alterations, and updates to the grip safety (to name a few) occurred. These kinds of changes were initiated to make the pistol easier to shoot.

Beginning in the 1940s different size variants were introduced as well as a number of different chamberings, the first to be a 22 Long Rifle conversion. One thing remained constant: the platform continued to reign supreme. In 1983, although the 1911 was now being produced all over the world, Colt introduced a major change. Interestingly enough, this change would not make the pistol easier to shoot, better looking, or even lighter to carry.

This change was to completely alter the safety parameters of the 1911 platform. The changes that the 1911 underwent in the early 80s included a Firing Pin All pictures courtesy of Peach State Armory (PeachStateArmory.com).

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David Marshall Williams developed a .22 caliber training version of the M1911 using a floating chamber for the U. S. Ordnance Office. This was marketed as the Colt Service Ace. Gunsmith legend Bob Marvel designed a .22 caliber 1911 conversion that is still available in various models from Marvel Precision and Nelson Custom, a design that remains a very popular and winning choice for Precision Pistol competition.

Safety as well as the ability to place the hammer in what is termed the half-cock position, to name a few. These changes specifically identified all models moving forward as either its predecessor the Series 70, or this new, safer design, the Series 80. My current Every Day Carry is the SIG Sauer Ultra Compact 1911 chambered in 9mm. This Series 80 1911 pistol is a dream to shoot, and like the majority of 1911 models, has its day on the range each visit!

Since its inception, the 1911 platform has been a mainstay in the world of law enforcement, professional carry, and self-defense. Throughout its illustrious history,

the 1911 has seemed to transcend all of the conventional modes of utility. In the late 1950s, Lt. Col. Jeff Cooper hosted the first modern organized combat competitive shooting events. The primary firearm used in these practical shooting competitions was non-other than the esteemed 1911.

Some of the most well-known by-products of the original shooting competitions hosted by Cooper are The International Practical Shooting Confederation (IPSC) and United States Practical Shooting Association (USPSA). In addition to being the heavily relied upon selfdefense pistol and the duty issued firearm for peace officers, the to being one of the most popular pistols in the world of competitive shooting.

Shooters like Julie Golob, Randi Rogers, Rob Leatham, and Nils Jonassan make light work of the paper and steel targets in action-based competitions nationwide each year. As a SIG Sauer Certified 1911 Armorer, Adjunct Professor of Firearms Technology for Sonoran Desert Institute, and co-owner of Peach State Armory (Peach

State Armory. com, I've spent plenty of time working on and training with this great gun.

The ability for a product to stand the test of time is a true testament to its solid foundation and quality of build. For a product to traverse the peaks and valleys of over a century is a mark of sustainability. Since its first major adoption in March of 1911, the pistol introduced by John Moses Browning has tended to remain largely the same while everything around it has seemed to change. Nineteen different U. S. Presidents have served our country since its adoption.

Passenger vehicles have evolved from the in-line 4-cylinder Model T Fords, to totally managed, self-driven electric vehicles. Consumers have went from preparing meals on an open stone hearth to zapping an entire meal in the microwave. While decades have elapsed and the world around us continues to change, one thing remains constant... the future of the past looks constantly bright! AG

FINISHING

Corrosion Resistance

Improving corrosion resistance is critical to protect precision manufactured goods such as firearms. Here's how Accurate Plating & Weaponry does it.

BY ROBERT A COGAN MARCH 2022

ORIGINAL PP. 10-12

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When it comes to finishes on metal parts of guns or metals out of which firearms can be manufactured, there are none that are corrosion proof. The key words in any description of finishes applied to the metal that firearms are manufactured from are corrosion resistance. The ability of a finish applied to a metal surface to resist wear and corrosion is dependent on its hardness, thickness of the deposit, and the inherent characteristics of the element or alloy being deposited.

There are several challenges faced by the refinisher of firearms. As the president of Accurate Plating & Weaponry, Inc. (APWCo-gan. com, I'll describe how we tackle them. The photos area tour of our facility. The first challenge is applying a deposit to the base metal that exhibits all the aforementioned properties and does not have to be applied at a thickness level that creates function problems due to the normally tight tolerances in quality firearms manufacturing.

In addition has a 5,000 square feet facility with 300 acres set up as a full shooting range complex. to being utilitarian, most firearms owners want their weapon to be aesthetically pleasing. The final challenge is maintaining a cost, which will be affordable with a blend of all the qualities mentioned above. While many people think that a firearm refinisher simply dips the parts in the tank and the job is done, this is decidedly not the case. The firearm must be disassembled prior to plating.

CORROSION RESISTANCE CONTINUED

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ing and fully reassembled and checked for functional correctness after plating. The art of polishing firearms is probably the most complicated aspect of producing a quality final product at every level of work in the industry. While there are machines that will produce flat, even surfaces and uniform round surfaces, so far only human beings are capable of producing refined finishing work on a consistent basis. The ability to find people who are interested in working in this field is dwindling.

This is why you see more and more manufacturers and custom gunsmiths turning to dull, black finishes of one type or another. This eliminates the need for skilled craftsmen. Technology is available to almost eliminate the need for human beings in the processes

where polymers, Parkerizing, or black oxides are used as the final finish. Plating solutions formulated for application in the firearms industry should duplicate the finish applied to the base metal prior to plating.

If a bright master polish is ordered, the base metal is brightly polished to get the bright finish out of the tanks. If a dull finish is ordered, plating is applied to a bead blasted finish surface after flaws are removed. If flaws are left in the base metal, they will be visible and apparent in the final finish even if a bead blasted finish is applied. The lighter the color of the plated deposit, the more apparent the flaws will be in the final finish.

Chrome is one of the hardest metals that can be deposited in firearms. When dealing with steels or stainless steel, chrome can be de-

posited to the base metal directly. These deposits exhibit a hardness factor of 65-70 RC. The thickness of the deposit will average approximately 0.0005 to 0.001. The corrosion resistance of chrome is similar to most other plated elements about 40-50 salt spray hours with a 0.0005 thick deposit.

Chrome has above average salt spray and chemical resistance to corrosion from certain types of acids and alkalis as are all other plated deposits. Chrome does not tarnish unless it is exposed to a chemical agent that is actually attacking it. When this happens, you will see a definite change in the color, or the finish or surface rust will become visible. Electrolytic nickel has a salt spray resistant comparable to chrome but Far

CORROSION RESISTANCE CONTINUED

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only 60% of the hardness factor of chrome (45 RC on the Rockwell C scale). Application can be at thickness levels that allow for reliable functioning of the firearm, excellent rust resistance, and wear resistance greater than the hardness of the base metal. However, all nickel finishes are susceptible to discoloration from oils, solvents, contact with human sweat, and normal exposure to the atmosphere. Cerakote polymer finishes are essentially paints. Their application to the metal is accomplished with spray guns.

Cerakote is a ceramic-based coating which gives it superior wear and corrosion resistance. It creates a hard surface that resists scratching and other abrasion, such as if the pistol is dropped or otherwise impacted by something. Cerakote is a ceramic, polymer-based proprietary coating that offers industry leading durability, hardness, scratch resistance, corrosion resistance, flexibility, heat, and chemical resistance.

The basic problem with polymer finishes is getting a thick enough deposit on the wear areas of the firearm without getting too much

build up in the areas where the moving parts function. Too much build up in these areas will cause malfunctions. Bluing is still a popular finish on steel firearms. Bluing does not have good wear or corrosion resistance compared to plated or polymer finishes.

However, it is traditional and can be accomplished on many levels of surface prep from dull matte bead blast to master polish bumper bright. Any of these finishing services are valuable additions to your gunsmith service offerings. We do them all. AG

MAINTENANCE & REPAIR

Mossberg MVP Maintenance

The Mossberg patented bolt design using popular detachable magazines makes for a great rifle but problems can still occur. Here's how I rectified one issue for my customer.

BY MICHAEL PRIEGO MARCH 2022

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A customer recently brought in a Mossberg MVP bolt action rifle chambered in 6.5 Creedmoor. Mossberg's MVP series is basically a bolt action rifle feeding from detachable magazines. The patented design is compatible with AR-15 (223 Remington/5.56mm NATO) or AR-10 and M1A/M14 (7.62mm NATO) magazines, depending on the chambering. The MVP Predator, my customer's model, is a compact rifle with a gray laminate, sporterstyle factory stock which allows the use of both M1A/M14 and AR-10/SR-25-style magazines.

This customer rarely uses her rifle other than for hunting purposes. This issue was, despite having no apparent obstruction in the action or barrel, she was unable to lock the bolt in the closed position. After further examination and a few attempts at closing the bolt, there seemed to be an issue with the bolt's extractor or the rails that the bolt glides across when pulling it reward.

To further attempt to resolve the issue, I retrieved an assortment of small rasp files, three different sizes of punches that will decrease in diameter, and an endoscope to have a better view of the issue within the chamber. Having the proper tools for the job always helps. An endoscope allows viewing the entire interior length of rifle barrels such as the lands and grooves and can be very helpful if you are having issues. The bolt stopped as if it is getting caught during its forward loading motion. with accuracy.

Most endoscopes are able to give you a cleaner, welllit image that can either be saved for examples or to provide a visual detailed image towards explaining the issues to your customer. The descending size punches help remove pins the proper way rather than creating small metal fragments that can cause more issues if the surface is not smooth. The small rasp files are used to

remove material in hard to reach places slowly so as to not create an uneven surface.

Having a squared end or a pointed end will help avoid the jabbing effect into areas that have soft material. After clearing the rifle, I first removed the bolt from the action and inspected the areas on the head of the bolt where the rim of the casing is pushed forward or grabbed by the ejector and removed once the round is spent. Looking at the bolt, it did not seem to have any deformations or mechanical issues that could be seen. I disassembled the bolt to check the firing pin as well as the ejector spring.

The spring and firing pin and spring were still in good condition and with plenty of retention. To take apart the bolt to inspect the firing pin, spring, and ejector, I started by using a small punch to lift the assembly on the rear end of the bolt and turn it counter clockwise to unlock the firing

MOSSBERG MVP MAINTENANCE CONTINUED

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Using a pointed round punch will help allow the pin to slide around the bolt housing and release tension once it has made a half turn to the open position. There will be enough tension so that you are able to feel the pressure release, yet it will not completely eject. pin from the bolt housing. Once the firing pin was removed, the a pin that holds the head of the bolt was able to slide out and the head inspected. I then used the endoscope to get a good view past the ejection port and near the end of the barrel.

Sliding the camera down past the ejection port, the close-up view allowed me to see that the guides the bolt glides on had a small piece of metal chipped on one of the guides. This was causing the bolt to jam and stop the cycle from loading and ejecting. I used a small square rasp file to remove the small burr of material that was stopping the bolt from locking into position. Using small, even, short strokes, I focused on how much material to be removed.

If too much is removed there will be a drop in the way that the bolt The head of the bolt has standard wear in the proper places and

the ejector is still rigid and firm. After checking the bolt and the internal components, I inspected the action to see if there was any build up or burrs that could be stopping the bolt. Using an endoscope, I could see that the center of the ejection port guide rail had noticeable wear and a slight bend.

Using a small pointed rasp file I smoothed the surface flat and even. rides forwards, which could create a safety issue for the user. Now that the materiel had been carefully removed, I placed the bolt into the lock position slowly to con-

MOSSBERG MVP MAINTENANCE CONTINUED

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Small amounts of debris are capable of causing other issues such as this one or developing a build up problem where the bolt's travel is restricted, creating re-chambering issues. If the bolt would not get caught where the material was removed. I then applied a small amount of oil to the bolt to allow less friction and smoother transition

when chambering the bolt so that it smoothly guides through the chamber during the cycles.

I checked my work with snap caps to confirm the bolt will lock and eject cartridges properly without getting jammed or caught. The completed work was then returned to my happy customer for her next bearing anew

round. I find Hoppe's Black Precision Oil helps with rust prevention and heat dissipation as well as being a great lubricant. I used a small amount on the head of hunting trip.

As far as I repeated this process multiple times to ensure functionality of the extraction, ejection, and smooth movement of the bolt's travel to complete the cycle.

RIFLES

Big Horn Armory

Because big is better! Finding a niche market in big bore guns, Big Horn Armory offers custom gunsmith services. Here's how they build the big guns that built their business.

BY ASHLEY BURGESS GALL MARCH 2022

ORIGINAL PP. 16-18

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Big Horn Armory was started with the idea to build premium, high-performance lever guns chambered in powerful, big bore cartridges. This was done to fill an obvious gap in the firearms market for a quick-handling, rapid-firing rifle in powerful cartridges. And it all started with a conversation in 2007. Shortly after Greg Buchel moved to Wyoming, he spoke with a neighbor of his, Frank Ehrenford. Frank was intrigued by Smith & Wesson's recent introduction of the 500 S&W revolver cartridge.

It was a great revolver cartridge and helped Smith & Wesson reclaim the most powerful handgun in the world title, but it was a gun that few people cared to shoot. The cartridge had too much power for a revolver, regardless of how heavy they made the gun. It begged for chambering in along gun. Several companies had been working on this problem. Since the 500 S&W is a rimmed cartridge, the obvious choice for along gun platform was a lever gun.

Lever guns are uniquely suited to rimmed cartridges because of their tube magazines where a rimmed cartridge is an advantage, rather than the hindrance the rim causes in a box magazine. Frank and Greg thought

the market was ripe for such a gun. They started by playing around with the different lever gun actions and found out what many before them had already discovered, that it just wouldn't work with a Marlin or anything else that was readily available.

Testing this big - bore caliber in these lever actions actually bent several of the guns. They simply would not hold up to the maximum 500 S&W pressure of 60,000 psi. The Big Horn Armory team knew what they had to do: build their own. And that's what they set out to do with modern steels like 17-4PH stainless and CNC machining techniques. Big Horn Armory overbuilt these guns, which was good because it meant the guns would be incredibly strong. This gave rise to Big Horn Armory's first firearm: the Model 89.

This process to perfect the gun and internals took several years from the initial founding in 2008, with the first guns shipped out in September of 2012. Based on the 1886 and the 1892, the Model 89 is a blend of the best parts of both rifles. In developing their first big-bore lever action, the Big Horn Armory team took apart several guns to figure out what they really

needed to do. They had a bit of a Goldilocks problem; the 86 action was too long, and the 92 action was too short.

This made the team realize in order to get the "just right" action, they would have to purpose-build the action size for themselves. In the process, they looked at the internals of the 86 and 92 and discovered that the 86 had parts that were a little too complex to machine. This discovery led the team to the decision to use the outside body design of the 86 in conjunction with the internals of the 92 to power the gun.

It became a true blend and with the size being halfway in between the 86 and 92, settling upon the name 89 just seemed right. Once the team had successfully completed the task of creating its own action sized to the S&W revolver cartridge, they focused on building the high-quality guns seen today. This was no small effort, as there was very little knowledge to work with aside from a small nucleus of dedicated staff who were devoted to lever guns.

Big Horn Armory had to train people to build them properly while they were learning the best ways to make them function as well. All the while, customers were asking when new chamberings

BIG HORN ARMORY CONTINUED

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would be added. The Model 90 in 460 S&W, Model 90A in 454 Casull, Model 90B in 500 Linebaugh, and the Model 89B in 475 Linebaugh all came along in successive years. The team had talked together early on about crafting a 460 lever gun and had originally decided against it. It was a more difficult cartridge to feed through a lever gun because it is very long compared to the 500 S&W. The team had to modify the cartridge guides to allow the longer cartridge to release at the correct point.

They also had to adjust spring pressures on the carrier to get the back of the cartridge to come up quicker and align with the chamber. The carrier also had to sit a little bit higher in relation to the receiver to account for the smaller cartridge diameter. Several other

parts required modification because of the skinnier cartridge. The Model 90 is a more difficult gun to build and tune as a result of this.

Even today, the Model 90 takes about twice as much time to run through Big Horn Armory's quality control builds. It is a much more finicky gun to get right than the Model 89. Fortunately, all of the development and required effort needed to make the Model 90 was worth it. The result is a finely tuned, high-performance lever-action rifle chambered in one of the highest velocity, .45 caliber cartridges available, the 460 S&W Magnum.

The team at Big Horn Armory was so enamored with the power of the 500 S&W in a rifle, that the company decided to keep going

BIG with its latest project, the AR500 in rifle and pistols models, which became available for purchase in 2018. Greg wanted the power and versatility of the 500 S&W Magnum but in the popular AR platform. The problem was feeding rimmed cartridges from a box magazine proved to be difficult, as is getting them to work with the locking and ejection system on an AR.

Working with Buffalo Bore Ammunition, Big Horn Armory developed the 500 Auto Max for use in the AR500 rifle and pistol. It is a rimless 500 S&W Magnum that feeds from box magazines. The AR500 is a unique rifle. It is currently the most powerful production AR-type rifle in existence. While it has several unique

BIG HORN ARMORY CONTINUED

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features, it is essentially the same rifle that Eugene Stoner designed in the 1950s. It has the same features, like a direct gas internal pistol action, a non-reciprocating charging handle, a rotary locking bolt, etc. What it doesn't share with Stoner's AR-10 is the cartridge. The 500 Auto Max is both larger in diameter, shorter in length, and more powerful in its ballistics. The differences pose some challenges in adapting the AR-10 platform to this cartridge.

The team at Big Horn Armory modified the ejection port, the bolt face, and the extractor. This allowed the cartridge to (Continued on page 22) move through the feeding and ejection cycle. The magazine well was also re-

duced to AR-15 mag dimensions, since the 500 Auto Max has the same overall length as the 5.56 NATO. Once all of that was completed, the AR500 rifle build became just like building any other AR. The lower is assembled using all the required springs, pins, and other parts.

Big Horn Armory uses a premium Rise Armament Drop-In Trigger, which specs out at a 4.5 pound pull weight for accuracy. It also uses an ambidextrous safety selector. The grip is an Ergo with a great texture and feel. The buffer recoil spring and buffer weights are tuned to the heavier recoil impulse of the 500 Auto Max. The upper is as-

sembled using a 416 stainless steel barrel chambered in 500 Auto Max and a specially modified barrel extension.

The bolt carrier group is coated to create a hard surface that is relatively impervious to wear and a slicker operating surface. This also generally reduces the amount of cleaning required. An adjustable gas block is used to allow for variation in loads or the use of a suppressor. The handguard utilized an M-LOK system to allow for the easy addition of accessories and featured a full-length extension of the Picatinny rail for additional sighting options.

CHAMBERED IN THE VERSATILE AND AVAILABLE 500 AUTO MAX, THE AR500

is a true 500 magnum performer. It is one of the only ARs that can deliver over 4,000 ft/lbs. of energy for amazing terminal performance. It can launch projectiles from a speedy 200 grain bullet to a massive, truck stopping 700 grains in almost any type of bullet imaginable: jacketed soft points, hollow points, monolithic solids, hardcast, and even frangible. A great benefit of the 500 Auto Max is that it doesn't require proprietary dies or tooling for reloading.

It was intentionally designed for easy reloading and accessibility. Whether a seasoned 500 S&W reloader or just getting started, the 500 Auto Max is easy to reload as it uses all of the same dies and tooling as the 500 S&W Magnum. As the company has continued to grow since its initial founding, and faced with the impact on suppliers and vendors due to COVID-19 restrictions and limitations, Big Horn Armory has begun to implement several changes in 2021 to improve product lead times for its customers.

This includes hiring more employees, obtaining a new and larger building, increasing the number of machinery, and doubling the company's sourcing suppliers. The goal is to increase Big Horn Armory's manufacturing capabilities by two to three times over the next year. Much of this will involve doubling the workforce in the manufacturing department with new personnel in assembly and quality control.

Currently, there is a core workforce of excellent people who will train and orient the new personnel to create more of its fine bigbore firearms for its customers. A new building will increase the manufacturing space by 500 percent and in addition to providing more manufacturing space, will also offer better facilities for building Big Horn Armory's firearms and for maintaining inventory.

New machinery will include CNC mills and lathes and barrel-making equipment, which will help to lessen the dependency on outside vendors. Big Horn Armory's firearms are not for purchases made on a whim. Its customers make thoughtful investments into heirloom-quality rifles that are aimed at giving customers the biggest bang for the buck. And after fourteen years of innovation in the big-bore long gun market, Big Horn Armory has no intention of slowing down any time soon. AG

SHOTGUNS

Choate Shotgun Upgrades

Having started by offering the first aftermarket shotgun magazine extensions, Choate Machine & Tool offers a diverse line of upgrade items for your shotgun projects.

BY MATT FOSTER MARCH 2022

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Just like everything else firearms related, shotguns have seen a huge boost in popularity over the last several years. Many purchased new ones while others looked to what they already owned to fit their needs. Some had to settle for whatever was available at the time of purchase. Many of these shotgun owners will be interested in upgrades.

If you are working on or planning upgrades on shotguns, Choate Machine & Tool has easy-to-install accessories and components to make scatterguns better for tactical or sporting use. Founded by Garth Choate in 1972 as a one-man tool and die shop, Choate

Machine & Tool (RifleStock.com, has been in the firearms accessory business for over 40 years.

Starting by providing gunsmithing and machine repair in Central Arkansas, Choate's first commercial prod- Below and This unit boosts capacity by two extra shotshells and has an indexable Picatinny rail section to add a light or laser as needed.

Above and The extensions from +2 to +8 capacity are available in scores of options for Benelli, Browning, CZ, Fabarm, Franchi, H&R 1871, Mossberg, Remington, Smith &

Wesson, Steven, Stoeger, Weatherby, and Winchester shotguns. ucts were magazine extensions for shotguns, which were the first aftermarket magazine extensions available to the public.

Beginning with magazine tube extensions for Remington 870, 1100, and Browning A5 shotguns, Choate has been making OEM parts for firearms manufacturers such Smith & Wesson, Remington, Mossberg, Savage, H&K, Winchester, Anschutz, Marlin, Harrington & Richardson, Nighthawk, Ruger, Beretta, Springfield Armory, and Kahr Arms since 1981.

CHOATE SHOTGUN UPGRADES CONTINUED

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Above and These stocks include a spacer system to adjust length of pull and can be had in conventional configuration (left), standard length pistol grip (center), and short length of pull (right) for youth or to accommodate body armor. Choate Machine & Tool is still one of the largest manufacturers of OEM parts for the firearms industry.

Originally started in a 1,200 square foot building, Choate Machine and tool now operates out of three separate factories, an Injection Molding plant, an Investment Casting plant, and a Final Assembly plant with a total of 95,000 square feet under roof. Accessory Options Increasing capacity is a common shotgun customization project, especially when adapting a sporting shotgun for home defense or tactical use.

Back when Choate first offered magazine extensions, shotguns using detachable magazines were largely unheard of. Yes, given James Paris Lee's patented idea had been in common use for a These can be ordered in orange to indicated less-lethal munitions.

century by then, shotguns taking a box magazine had been attempted but nothing in common use.

The plastic hull common in shotgun ammunition coupled with the very wide and flat front nearly the same width as the chamber make reliable feeding from a box magazine much more challenging than metallic rifle and pistol cartridges having nicely pointed and tapering projectiles. Shotguns with detachable box magazines are now available from companies such as Remington and Mossberg as commercial options after considerable work.

For example, only recently have Research and Development teams been able to use modern computer modeling and high speed photography to identify problems and then create a working solutions. Tube magazines normally loaded one shotshell at a time remain the norm. Choate offers magazine tube extensions for Benelli, Browning, CZ, Fabarm,

Franchi, H&R 1871, Mossberg, Remington, Smith & Wesson, Steven, Stoeger, Weatherby, and Winchester shotguns.

The company has scores of options in extension lengths to increase capacity from +2 to +8 sizes. These units include a magazine spring, base clamp, and High Visibility Shell Follower to easily see when the magazine is empty. Firearm-mounted lighting is another useful accessory, especially with long guns. The Choate Night Manager is a magazine tube extension with an aluminum shroud that is drilled and tapped along the bottom and sides for mounting Picatinny rail sections.

These magazine tube extensions can mount lights, lasers, and other Picatinny accessories. The Night Manager also boosts capacity by two extra shotshells and has an indexable Picatinny rail section to add a light or laser as needed. The Night Manager is an all steel construction magazine tube extension with an aluminum shroud that is drilled and tapped along

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the bottom and sides for mounting Picatinny rail sections. The shroud can rotate to orient the attached Picatinny rails where needed and uses an AR-15 castle nut to lock it down in the desired location. By mounting accessories on the magazine tube extension it allows use of the full length of the shotgun's fore end, which often can be short on law enforcement type models. The Night Manager also includes a sling mounting plate that can be installed to attach the sling on the right, left or bottom of the shotgun.

Currently the Night Manager is available for the Remington 870, 1100, 11-87, H&R Pardner pumps, and the Hawk 982. For Mossberg shotguns the Night Manager is available for the 500 (no extra shell capacity) 590, 835, 5500, and 9200. As the company's domain name implies, Choate makes a number of stocks for all types of long guns. Shotgun options range from more Side folders accommodate receiver sights but may need a compatible forend.

This allows for length of pull, height, and cant adjustments. simple fixed polymer stocks to offer a more durable upgrade from a factory wood stock, orange stocks for use of designated less-lethal munitions, folding stocks, and stocks that carry extra

ammunition and others. The Mark 5 models are conventional fixed stocks with a spacer system.

Originally designed for police and military for use to adjust overall length to accommodate body armor, the Mark 5 spacers also work great for hunters and recreational shooters. Mark 5 stocks are available in standard, conventional length pistol grip, and a shortened pistol grip model for youth shooters or for shooters wearing body armor and other bulky gear. The spacer system includes two half-inch spacers which adjusts the length of pull from 13" to 14".

Additional spacers can be purchased in 1/4, 1/2, and 3/4-inch sizes and the length of the stock can be changed by adding or removing spacers and longer screws as needed. The Mark 5 also reduces felt recoil and muzzle climb to make follow-up shots with a one-inch recoil pad. The stock is made of a tough fiberglass-filled plastic and comes a recoil pad and quick detach swivel stud. The Mark 6 stock is a fixed stock system holding five rounds in the bottom.

It also uses Choate's adjustable length of pull spacer system and includes a one-inch thick recoil pad. The Mark 6 holds 2 3/4 to 3 1/2-inch 12 gauge shotshells and the

shooter can adjust how hard it is to remove the shells by tightening the adjustment screws on the side of the shell holder. The Mark 6 can also be ordered in orange to indicate less-lethal usage. If stock adjustability beyond the length of pull is wanted, Choate offers their 3-Way Aluminum Recoil Pad.

Made of 6061 T6, this adjustable butt plate fits Choate's Tactical stocks, Varmint stocks, Mark 5 and Mark 6 conventional stocks, and others. In addition to adding a useradjustable length of pull between 1 11/16 inches to 2 3/4 inches, the butt plate also has a horizontal adjustment of 1 1/8 inches up or down and cant. All adjustments to the 3-way butt plate are made with an 5/32 Allen wrench. The butt plate is completed with a rubber butt pad and the aluminum pieces are hard anodized black.

For shotgun builds needing more compact storage, a folding stock can be added. Choate offers models for Fabarm, Ithaca, Mossberg, Remington, and Winchester shotguns. Folding stocks can be had as top folding or side folding. For compactness, top folding stock is a good choice. These stocks are made of solid steel and operated by pushing a thumb button to lock it in

Above and either the open or closed position. This stock fits shotguns with rifle sights and ventilated rib barrels but may not fit shotguns with receiver sights (especially ghost ring-style sights) or optics. Side folding stock models shorten the overall length of the gun by 11 inches when folded. The side folding stocks are made of 4140 steel and fiber-glass filled plastic.

A 1/2 inch steel hinge pin locks the stock in open and closed position, making for a solid unit built to take heavy recoil such as from 3 1/2-inch shotshells. They come with a one-inch recoil pad, sling loops, and a minimum-length forend which must be used to get the stocking into its fully closed position. The third folding option is also a side folder but it features a telescoping butt stock like the M4.

The M4 Telescoping Side Fold Stock offers a compact long gun for easy storage as well as the option of adjustable length of pull. The folding housing, hinge, and hinge pin are made of steel. The telescoping M4 stock is made with a heavy tube designed to take the recoil of 3 1/2 inch 12 gauge. The length of pull adjusts from 13 3/4 to 16 3/4 inches.

This kit includes the pistol grip and side folding housing, allowing you to add a telescoping M4 stock, tube, and castle nut of your choice. The stock includes a forend that fits the unit with fully closed. As an additional option, Choate offers the M4 Telescoping Side Folder Housing as a build-it-yourself unit. This kit includes the pistol grip and side folding housing, allowing you to add a telescoping M4 stock, tube, and castle nut of your choice. AG

READER FORUM

Reader Forum

BY AMERICAN GUNSMITH EDITORS MARCH 2022

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Market Report Capstone Partners, a middle market investment banking firm, compiled a report on the firearms industry. Based on 2021 data, the Tactical Industry Update (Consumer, Law Enforcement, and Defense) showed the industry experienced significant growth throughout the pandemic, primarily driven by the Civilian Consumer segment as government-imposed lockdowns and safety restrictions led to an increase in demand for hunting and shooting sports equipment.

Pandemic tailwinds including the high demand backdrop in the civilian segment and the shift in firearm ownership demographics translated to elevated merger and acquisition (M&A) volume as strategics and private equity (PE)-backed companies looked to enhance market share. The report features a question and answer section with James Sellers of the Sellmark Corporation discussing the growth of the industry, M&A trends, demand forecasts, and market positioning and strategy.

Headquartered in Mansfield, Texas, Sellmark manufactures and develops products for the civilian, military, and law enforcement markets and the company leverages sales by gauging shifts in consumer preferences to continually adjusting. "Strategics, financial investors, and lenders have reviewed an increase in the number of tactical, outdoor, firearms and ammunition deals in market during the last AmericanGunsmith.info/writers-guidelines Snail mail: American Gunsmith year.

They have noted a significant increase in company revenue, profitability, and margins, and expect similar performance trends in 2022. While less certain on projecting company financial trends in 2023 and beyond, many are increasingly expecting that consumer demand and retention will be more sustained and that a higher floor is emerging in the industry," said Capstone Managing Director Peter Bailey, the lead contributor in the newly released report. The report has some key takeaways.

Firearm companies serving consumer end markets have benefited from shifting firearm ownership demographics and record first-time gun purchases. Given the strong demand backdrop, Capstone expects merger and acquisition activity to continue at a healthy pace through year-end and into 2022 as buyers look to bolster market share.

Record outdoor participation rates during the pandemic are expected to translate to elevated demand as the current spike in sales is driven heavily by a rise in first-time gun owners with increasingly diverse demographics. Higher levels of defense spending in the near-term will benefit firearm and ammunition manufacturers, especially those with military contracts.

Ammunition prices have soared due to nationwide shortages, unprecedented demand from the civilian market, record first-time gun purchases, and rising raw material prices. Companies in our industry are monitoring the regulatory environment, with some moving to states that are more business friendly to firearms companies. M&A activity has increased year-over-year as strategics actively sought target companies with complementary product offerings and exposure to growing segments.

Buyers and investors are increasingly attentive to managing a portfolio of complementary brands which influences how they view various acquisition opportunities and respective fit. The complete report can be downloaded free at: CapstonePartners.com/insights/tactical-december-2021 Remington and Rem Arms Remington Arms Company LLC was an American manufacturer of firearms and ammunition and is now defunct. The brand has split into two separate entities: guns and ammunition.

The firearm branch is now known as Rem Arms LLC (RemArms.com), a recently formed entity that acquired the Remington firearms division from the Remington Outdoors Company.

The previous Ilion Firearms Plant in New York is still listed and operational, however, the new plant in La Grange, Georgia is not up and running yet. Remington Firearms plans for the La Grange Plant to serve as their global headquarters and manufacturing facility. In late 2021, Georgia Governor Brian P.

Kemp announced that Rem Arms has a \$100 million, five year development project employing over 850 people. "The state's firearms industry is responsible for thousands of Georgia jobs and millions of dollars of investment in our communities," said Governor Kemp. "It's a pleasure to welcome Remington Firearms, with its rich American history, to their new home and global headquarters in the Peach State.

I look forward to seeing the opportunities Rem Arms creates across west Georgia." "We are very excited to come to Georgia, a state that not only welcomes business but enthusiastically supports and welcomes companies in the firearms industry," said Ken D'Arcy, Rem Arms CEO. "Between the support we've received from the state and from or post a letter to Falls Church, VA 22041. For subscription questions or mailing problems contact American Gunsmith

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