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INSIDE THE ARCHIVE

REQUIEM FOR A GUNSMITH, PART TWO

CROWDFUNDING • WORKING THE RUGER P89 • CUSTOM RIMFIRE HANDGUN CLEANING ROD • DEVELOPMENT HISTORY ...

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 118

DIGITAL ARCHIVE EDITION

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IN THIS ISSUE

Contents

A complete guide to the searchable editorial work preserved from October 2013.

2**Crowdfunding**

AMERICAN GUNSMITH EDITORS • ORIGINAL PAGES 2

3**Working The Ruger P89**

DAVID W. MANNEY • ORIGINAL PAGES 3-5

6**Custom Rimfire Handgun Cleaning Rod**

NORMAN E. JOHNSON • ORIGINAL PAGES 6-8

9**Requiem For A Gunsmith, Part Two**

WENDELL DEANER • ORIGINAL PAGES 9-15

16**Development History Of The Modern In-line Muzzle Loading Rifle**

IRVEN F. PALMER JR. • ORIGINAL PAGES 16-17

18**Inexpensive 1911 Safety Upgrades**

ROBERT K. CAMPBELL • ORIGINAL PAGES 18-22

23**Reader Forum**

AMERICAN GUNSMITH EDITORS • ORIGINAL PAGES 23-24

FROM THE ARCHIVE

Crowdfunding

BY AMERICAN GUNSMITH EDITORS OCTOBER 2013

ORIGINAL PP. 2

From Action Target Newsletter (actiontarget.com). In the old days, if you wanted money to finance a project or new business you could talk to local business investors, obtain a small business loan, or beg a rich uncle. If none of those worked, then you put the project on the back burner and waited to win the lottery. It didn't matter that there were tons of people who wanted whatever product or service you had to offer. If the people with the money weren't convinced, then you really didn't have any other options.

Crowdfunding Crowdfunding, where individuals contribute small amounts via online campaign, started in the late 1990s and has been used to fund bands, movies, art projects and inventions. Online companies now provide services to organize the effort and a total of \$2.7 billion has been raised in 2012 alone. The JOBS (Jumpstart Our Business Startups) Act signed in April 2012 opens the doors for startups to solicit equity financing from the general public pending implementation of regulations by the SEC.

Business partners Rob Krop and Matthew Jones are doing this with a campaign to build an indoor shooting range in Frederick, Maryland, called The Machine Gun Nest (themachinegunnest.com). The pair started the project to build an indoor range in a neglected area and create responsible gun owners one experience at a time, settling on Indiegogo (indiegogo.com), a service allowing people to donate to the campaign by purchasing one of several perks including pistol and machine gun rentals, and various memberships.

They also offer more extensive perks for larger donations.

The Machine Gun Nest raised nearly \$22,000 in the first 24 hours of launch and their campaign has increased the project's visibility among future customers. "This provides avenue where we can not only raise capital, but we can raise awareness and reward people for believing in us before the project is created by giving them discounts for their donations," Jones said. "They see dollars that are going toward something that they also care about." Other shooting ranges have attempted to finance themselves through Indiegogo in the past, but only one managed to raise more than \$195 after a full 60-day campaign.

The difference with The Machine Gun Nest campaign, Krop says, is that they're hitting the pavement and talking to people about it in person as well as online. "One of the things that has really helped us is just getting out in front of people. People seeing that we're moving forward and that we're out there in person gave a lot more validity to what we're doing, and people felt more comfortable donating," Krop said.

The Machine Gun Nest may become the first shooting range ever to be successfully financed through crowdfunding and may pave the way for other ranges like it. With crowdfunding expected to explode in the next year and with the implementation of public equity financing coming soon, the shooting range industry has a unique opportunity to bypass traditional financing options and get direct support from the shooting community itself.

MAINTENANCE & REPAIR

Working The Ruger P89

A tough, rugged and reliable gun, although blocky in appearance, it is very serviceable.

BY DAVID W. MANNEY OCTOBER 2013

ORIGINAL PP. 3-5

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The Ruger P89 was introduced in 1993 as the replacement for the P85. It is essentially an upgraded P85 MKII with a number of new features. Production continued until 2009. The P-series was designed for police, military and the civilian market. This semi-automatic pistol features has a short recoil operating system with a locking breech. The barrel has a link system like the 1911 and a locking system like the SIG P220. Two different triggers systems offered are double action/single action or double action only.

Ruger made the standard model with a manual ambidextrous safety/decocker. The decocker models only have the decocker and no manual safety, while the double action only models had neither. These instructions will work for the P90, P91, P93, P94 and P944 guns, as these guns are all very similar in design. Field Stripping Lock the slide back and remove the magazine, check the chamber is empty and wear eye protection. The recoil spring is under a lot of pressure and can do serious damage to one's eye if not protected.

Make sure the slide latch has a firm grip on the slide by pushing upward on the slide release. Looking from the top into the magazine well, you can see the ejector. Push forward and downward on the ejector until it stops. With your right hand wrapped around the back of the slide, hook your thumb around the back of the grip and pull the slide back. Push in on the slide latch and pull it out until it stops, a little more than inch. Slowly release the slide and the slide assembly will come off the frame to the front.

To remove the recoil spring, keep a tight grip on recoil assembly pull back and off the barrel lug. Keep this under control as it can fly up to 15 feet away. The barrel is free to be pulled up and out of the slide, using the lug of the barrel. This is all the further that Ruger recommends that the pistol be broken down for basic operator maintenance. Detailed Disassembly Start with the slide. To remove the extractor, push it outward using a small punch.

When it is out far enough, it can be moved forward and removed. The right safety lever can be removed when the safety is in the fire position. Gently pull it away from the

slide, keeping a hand under it to catch the plunger. Rotate the left safety until it is pointing down. Gently pull the lever out of the slide with a hand to catch the firing pin, which will come out the back of the slide when the lever clears the slide.

The rear sight is removed next by loosening the hex screw and pushing to the right of the slide with a non marring punch. The firing pin block will come out from under the sight, so be careful to catch it as the sight comes off the slide. The only piece left is the front sight blade, held in place with two split pins. Drive out only enough to release the sight, but not all the way out, as the small size of the pins makes it very hard to get them back into place.

I don't recommend removing the pin from the barrel link unless you need to replace the link. If replacing the link, replace the pin along with it. It has a slight swage on both sides to keep it in place. You will have to upset the one side when replaced. Frame Remove the screws holding the grips. With your finger, push up on the grip from inside the magazine well. Gently pull the right magazine release out the right side. The left magazine

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release has to be pushed forward and may need to be tapped out from inside the frame. This is a tight fit, so if it doesn't move under light pressure it is not lined up correctly to come out. The magazine latch spring tilts backwards and pulls up out of the slot. Make sure the hammer is uncocked. Put the frame on the work bench and push down on the mainspring cap. You will be able to push out the pin holding the cap in place. Slowly lift up and the cap, mainspring and hammer strut will come out.

With the ejector in the up position, push out the pin holding it and the spring. Pull the freed pieces forward and out of the frame. Next push out the sear cross pin, releasing the sear and spring. The sear blocking lever is released by pushing out the pin for it. The hammer is held by a lever from outside the frame on the right side. Pulling this out releases the hammer. Lift up on the spring holding the slide lever and pull out to the left.

Lift up on the trigger and the trigger and trigger bar will come out the top of the frame. Use a 1/16" punch to drive the spring retaining pin into the frame. Slowly pull the punch out. The slide lever spring is holding the trigger bar retainer in place. Lift up on the back end of the spring and rotate it out of the frame. This will re-

lease the trigger bar retainer, spring and plunger. On the magazine, there is a split pin that holds the base of the magazine to the shell.

Drifting this out will allow the base to separate from the shell. The spring and follower will come out the bottom with the base. Tips for Reassembly Starting with the slide, put the firing pin and safety levers in before the firing pin block and rear sight. The firing pin block will stop the firing pin before the safety levers can be put back in. You could push up from the bottom, but it is easier this way. The firing pin has a nub on the back that goes to the right.

I use a 3/16" brass rod, inserted through the barrel opening to reset the extractor. For frame reassembly, the sear spring dogleg goes to the rear and hooks on the sear block. When reassembling the mainspring, put the hammer strut in first and make sure it is hooked on the hammer. Put the mainspring cap on and push down on the bench to put the pin back in. Reinstall the ejector and spring back into place, making sure it is behind the sear.

With the ejector down, reach through and hook the spring back on the ejector. AG



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KV00613-50 Barrel Assembly KV02112 Blocker Lever
Q01521-100 Decocker Lever, Assembly Left Q01552
Decocker Lever, Right V06480 Decocker Lever Spring
KV06460 Decocker Lever Spring Pin V06520 Decocker
Lever Spring Retainer V00903 Ejector KV01250 Ejector
Pin KV00951 Ejector Spring V01400 Extractor
KV01121 Firing Pin KV02102 Firing Pin Block
KQ05600 Firing Pin Block Spring KV01850 Firing Pin
Spring V03203 Front Sight V04700 Front Sight Cross
Pin V00800 Grip Panels V01300 Grip Panels Screws
V22000 Guide Rod V22000-100 Guide Rod/Recoil
Spring Assembly KV04003-100 Hammer Assembly
KV22300 Hammer Pivot Assembly Ruger P89 Series

(Specifications subject to change without notice)
V00400 Hammer Spring V02400 Hammer Spring Seat
KV02550 Hammer Spring Seat Pin V01601 Hammer
Strut P-15/10 Magazine V02601 Magazine Latch, Left
V02600 Magazine Latch, Right V02700 Magazine Latch
Spring V03301 Rear Sight V08001 Rear Sight Lock
Screw V02800 Recoil Spring KV02217 Sear KV04450
Sear Pivot Pin KV06420 Sear Spring V00111 Slide
V03700 Slide Stop V04500 Slide Stop Spring V03400
Slide Stop Spring Retainer KV03900 Trigger KV01704
Trigger Bar KV03500 Trigger Bar Plunger KV03650
Trigger Bar Plunger Spring V04200 Trigger Bar Spring
Retainer

MAINTENANCE & REPAIR

Custom Rimfire Handgun Cleaning Rod

Important tips on cleaning those .22 rimfire semi-automatic pistols for best accuracy.

BY NORMAN E. JOHNSON OCTOBER 2013

ORIGINAL PP. 6-8

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Cleaning the little .22 rimfire semi-automatic handguns must be done properly or performance will deteriorate. A special cleaning rod makes the job easier as it protects the bore. While we can purchase a suitable cleaning rod for the semi-auto rimfires, making one proved a good choice for me. Much controversy surrounds the care and cleaning of the .22 rimfire bore and chamber. Some of the thinking here is totally wrong, and can lead to poor accuracy and fouled-up bores.

Making The Cleaning Rod It is not necessary to routinely disassemble .22 rimfire pistols to clean the bore. These little guns can easily and safely be cleaned from the muzzle. A proper length and diameter cleaning rod made of aluminum is a good choice. The preferred cleaning rod material for this is half-hard aluminum 0.204 inch diameter. This is just under bore land diameter and permits drilling and tapping for 8-32 thread cleaning jags and brushes.

Choosing a rod length of 12 inches is about right and will allow for fitting a free rotating handle, as I will describe. Utilizing a section of existing aluminum cleaning rod material with pre-drilled and tapped jag hole is a good choice as well. Just put the handle on. Making and fitting the swivel type handle is the next step. I

chose a piece of round $\frac{3}{4}$ inch diameter fiberglass stock for this. A hole just over rod size is drilled through the handle.

An extended flange, the size of the spacer washer, is turned at each end of the handle. Annular grooves spaced about half an inch apart and 1/16th inch deep are cut into the handle while in the lathe. The handle is then precisely faced to length, allowing for an interspacing washer between the E-clips positioned at each end. A race to retain the E-clips is cut at each end of the handle just outside of each washer. Allow for a little end play here. The handle is then locked in position.

A drop of lubricant is applied at each end and it's ready to go. **Cleaning .22 Rimfires** For each word printed on rimfire cartridge bore care, there are perhaps dozens of words written on the various aspects of high power rifle accuracy and cleaning. This is likely because the rimfire bore is subject to a different type of fouling and is easier to break-in and clean. High power rifle bores collect copper and carbon fouling due to higher working pressures and velocity and different bullet material.

Further, these bores require a prescribed break-in regimen for best accuracy and prolonged performance. The accuracy life of a normal high



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22 Rimfire Semi-automatic pistol with 2½-10 Sightron scope. The cleaning rod described in text is shown above along with a 25 yard target showing (from left) first and second groups following cleaning. power bore is less than a tenth that of the average rimfire bore. As received from the manufacturer, the average match-grade .22 rimfire bore may require little, if any, specific break-in. Other rimfire bores may break in through normal shooting and cleaning.

I do, however, break-in all my 22 rimfire bores using a good scrubbing with an ultra-mild abrasive like J-B Non-Embedding Bore Cleaning Compound. This is best done from the chamber end of the bore or with an undersized cleaning rod from the muzzle. Just use a tightly fitted patch on a jag, well saturated with the compound, and make about 30 passes forth and back through the bore. This is done only once, followed by the cleaning regimen I will describe.

Always be sure the cleaning rod is moved perfectly in line with the bore to avoid contact with the lands as much as possible. This is why a softer material is best used as a cleaning rod. It is also important that the cleaning rod is wiped down clean of any grit before each use. The .22 rimfire bullet, made of various lead alloys,

is coated with a special wax-like material which varies by manufacturer and sometimes even different bullet types by the same manufacturer.

The bullet coating serves as a lubricant and cleaner for the bore as well as enhancing accuracy. Much research has been done on the coating of rimfire bullets over the years with amazing results in performance. Powder fouling and lead deposits throughout the bore are minimal through normal shooting and extreme accuracy is often seen for extended periods of time. However, some caveats should be noted. The .22 rimfire bore is subject to lead fouling immediately ahead of the chamber.

This lead and carbon fouling seldom extends beyond the lead or throat but it can build up in the bore following extended shooting. Here I use a bronze brush, which I shorten down to an inch of working surface. I can then pass this brush from the muzzle of the .22 semi-auto pistols through the chamber without any reverse-bristle brush hang up. Most of the bore cleaning solvents, along with the brush, will remove these lead deposits and the bore will go on shooting well until it "tells" you it needs cleaning.

Again, I avoid the use of any strong copper solvents in .22 rimfire bores. Here are some of the things you must look for, and expect, as you shoot

CUSTOM RIMFIRE HANDGUN CLEANING ROD CONTINUED

ORIGINAL PAGE 8

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.22 pistol cleaning rod along with a brass jag, patch and .22 caliber bronze brush. Note the removal of bristles from the brush except for last $\frac{3}{4}$ inch. This allows the brush to be pushed completely through the bore and into the magazine area without being hung up from reverse bristles. .22 rimfires for best accuracy. Following cleaning, or changing brands or types of ammunition, the bore will require a seasoning period as the bore's coefficient of friction normalizes or reaches a state of balance or equilibrium.

This is essentially a state of adjustment between influencing elements but it is real and you will notice it. In general, you can expect to shoot three-to-six shots when changing ammo or following bore cleaning for the bore to resume normal bullet impact or grouping on target. You will never catch competition

shooters off guard here because they learn the unique differences of each bore they shoot. One day I was testing one of my scoped .22 rimfire semi-auto pistols at 50 yards.

I was using a Browning Challenger with a 6 $\frac{3}{4}$ inch standard weight barrel equipped with barrel mounted scope rings of my own design and a parallax-free 2 $\frac{1}{2}$ -10X Sightron scope. I was shooting from a well proven pistol rest designed for .22 semi-automatic pistols. After changing ammunition I shot a bewildering 1 $\frac{1}{2}$ inch, five shot group. Not to despair, as my next group was an amazing $\frac{1}{4}$ inch and this was followed by more good shooting.

A 50 yard, quarter inch, five shot group fired with a .22 rimfire semi-automatic pistol is extremely rare accuracy and can come 22 cal-

iber, semi-automatic pistol barrel into the magazine/receiver area. This allows the brush to pass fully through bore without reverse bristle hang-up. Cleaning is very effective in this way. 22 rimfire immediately following cleaning, followed by the second group post cleaning.

A change in ammunition is also likely to cause this effect in grouping and bullet impact for the first few shots. only through proper bore care and correct shooting method. Conclusions The bores of our lowly, little rimfire cartridges deserve a little more cleaning and care than they usually get. This particularly applies to those fine, little .22 semi-auto pistols that are all too often used hard and put away dirty. AG

FROM THE ARCHIVE

Requiem For A Gunsmith, Part Two

A gunsmith reminisces over decades of hard-won knowledge.

BY WENDELL DEANER OCTOBER 2013

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In part one of this series, we began by asking and answering some common questions that may arise between a gunsmith and his customers. It's a for-fun exercise useful only for entertainment value. You can probably think of dozens more. Many of you may disagree with some of my answers. Feel free to point this out. I'm not right all the time, but I try to keep my average at 99.9% or better! Is casting your own bullets worth it? Here's another depends answer. If you have a source of supply and the time, go for it.

I started casting bullets in the 1970s. Back then, it was a pretty common practice, mostly because the bullets commercially available for handguns were made from lead and good casting materials, such as linotype, pure lead, tin and wheel weights, were readily available. Nowadays, most of the really good stuff like linotype has to be purchased from a supplier and shipped at considerable expense. This negates any sav-

ings since you can buy almost any type of bullet already cast, lubed and ready to shoot.

For some, the cost is immaterial since they cast for competition, such as in black powder cartridge rifles, and are very finicky about the blend of alloys and use custom molds that are pretty expensive. I now use wheel weights almost exclusively for my casting. I do have some linotype squirreled away for a rainy day and even some pure lead and tin, but it's rare when I can't use plain wheel weights, including rifle bullets.

I have read in some publications that wheel weight sources are drying up due to the price of lead in India and Pakistan. Maybe, but just the other day I stopped by a local tire shop and they gave me all the used weights they had. I guess I have about a ton stored so far and I always accept any I can find for free. My main casting these days is for old military rifles, such as 8mm Mauser and 7.62x54 Mosin Nagant. Those of you who have milsurp rifles and want to shoot them take note.

Personally, I have no interest in hunting with these rifles and only use the bullets with reduced loads at the range. For rifles, I prefer to use gas checks. This gives you a little more leeway as to the pressure. Like some other things, you can never get enough. Although a lot of sources are dried up it's still available on the cheap. Wheel weights make good bullets. of the loads and may help leading problems. Sometimes cases are difficult to find in the Mosin.

I use factory loads as my source as they can be cheaper than some supplier's empties! Last I checked, Prvi loaded ammo with cases suitable for reloading cost \$15.99 for 20 while the same number of empty cases from Nosler will set you back \$24.99. Also, my rifle bores slug at 0.310 inch, not 0.308 for the Russian jobs. Although Hornady and Sierra and others list suitable jacketed bullets (usually meant for the .303 British) in their catalogs, try and find some at your local gunshop in that odd diameter.

Molds are available to cast them, though.

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The initial cost of equipment will be amortized quickly. The Lyman on the right has been in use for more than forty years. With the reduced loads, the cases seemingly last forever. Just make sure you don't use any that are loaded with corrosive primers to start out with. I have used bullets without gas checks on such rifles as the .30-30 Winchester Model 94, putting about 1,000 reduced rounds through one using IMR Trail Boss and Hodgdon H4895 powders. The bore scope revealed an almost pristine inside.

I detected more copper washing than lead fouling. Use of lead bullets and reduced loads in any gun, but especially old shooters, will give you a barrel that will last a very long time, though you may have to work on your sighting arrangement with guns that sport open sights. With my Model 94 the reduced loads were shooting about fourteen inches low and the original sights could not be adjusted to point of aim.

My gun was manufactured in an era when it was common to come from the factory drilled and tapped for receiver sights, so switching

to He told me he thought they were submarine anchors. I'm saving them for a rainy day. Sometimes it is easier to make your own than to find components. a William's 5D was easy and cured my elevation dilemma. Hunting with cast bullets is another story but it can be done successfully.

I cast for fun but when I get serious I can turn to one of the commercial suppliers for a good product, an example being my trail gun, a Ruger Blackhawk in .41 magnum with a 4-5/8" barrel. Cast Performance Bullet Company supplies

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me with a 255 grain WFNGC that I push with as much Winchester 296 powder I can stuff in the case. Bears and other dangerous critters, beware. I usually buy my lead bullets in bulk for most of my handgun shooting. In my younger days I would take a week or two and do nothing but casting for my handguns that I use on the range making sure I had four or five thousand of each to last me for awhile. I don't have the time I used to. So, is bullet casting worth it? A better answer would take up a whole book.

The best I can say on this one is it depends. Should I handload on a progressive or single-stage press? Yes and yes and no. Here again, what are you loading and what for? Did you

just start to hand load or are you experienced? Competition shooters, especially for handgun disciplines, go through thousands of rounds a year just in practice. Very few of us have the money to match that kind of shooting with factory loads, so hand loading is a necessity.

For that kind of volume, loading on some form of progressive press is also a necessity. That being said, if you are at that level of competition you didn't start rolling your own yesterday. Progressive presses are not more dangerous than single stage tools and they produce good, accurate solids for my trail gun come lubed and gas checked. I sleep easier in camp.

I was lucky to have a rifle that was pre-drilled and tapped for receiver sights at the factory. rate ammo, but they do demand attention to detail while using them. I've found that shooting the bull with my buddies while I'm loading a couple hundred to miss putting powder in one or two cases. The primer, of course, doesn't realize I've screwed up and is happy to push a bullet halfway up the barrel at the range thereby creating a recipe for disaster if I don't catch the difference in recoil and muzzle blast.

I HAVE READ

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Unfortunately, I don't have the time anymore. The two Dillons on the right are set up for specific cartridges but can easily be changed to others. stories about competitors in Cowboy Action Shooting matches (notorious for using the lightest loads they can get away with) stacking five or six bullets in a barrel before realizing their error.

The trouble with progressives is no matter how many safety features like powder checkers and such are employed, one can somehow end up with either an empty case or one

filled with a double charge of powder in the batch, neither of which makes my day. By all means utilize You might notice that they are mounted on and old dresser that I dug up somewhere and used in my small apartment for many years.

It is made solidly and will work for the rest of my life. any safety features that are available, but one thing I've done is to limit my loading to when I'm alone and can pay attention to what I'm doing. That isn't to say you can't get in trouble when using a single-stage

press. I have a buddy that wanted to learn how to reload, so I started him out at a single-stage press putting together some reduced loads for his .270 Winchester.

One of the safest ways to load like this is to use a loading block where all of the loads are individually weighed and inserted in the cases. Then a flashlight is used to check them all to make sure none of the loads are heavier or lighter than the others. Pretty safe, huh? My friend loaded about fifty rounds while I did some

REQUIEM FOR A GUNSMITH, PART TWO CONTINUED

ORIGINAL PAGE 13

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45 ACP barrel was bulged by dropping the hammer on a loaded round when a bullet was stuck in the barrel. Not a pretty picture. Other work and generally oversaw what he was doing. When he was finished I asked him if he checked all the powder levels with a flashlight. Yep. So far so good, except one of them froze the bolt when fired at the range and a lot of smoke rolled out of the action. Did he really check the loads? The problem was that a double load of SR4759 would fit into a .270 case without overflowing.

I recommend using a powder such that a double load will overflow the case. Sometimes this is not always feasible. IMR

Trail Boss has helped this situation, especially in large cases such as the .45 Colt. I usually use Hodgdon H4895 in re- I have used it for many years and expect to continue. The duct tape holding the hopper on is because it broke along time ago. duced loads of rifle rounds. I also recommend becoming experienced before switching to a progressive press.

Today's shooters, especially the young ones who can't wait to blow off a million rounds with the black rifles as fast as they can pull the trigger, need to slow down a little. Load testing development and hunting ammuni-

tion that only requires forty or fifty rounds a year is easily accomplished on a singlestage press.

You see these articles where somebody is advocating using a powder measure to throw all your rifle loads "because the bench-resters do it." It works for them because they are using the same equipment and one powder that they've worked with along time. We, on the other hand, may be using five or more different powders in load development. Try it yourself. Weigh some charges of a "stick" powder and then try to throw some. You'll get the picture

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Everything it does can be accomplished with hand tools but this little machine really speeds up the process. This little press from Lee Precision will take care of many tasks and only costs around twenty bucks. real quick. On a progressive press, many shooters use an easy-measuring ball powder and don't redline every load. Why hurry? The hunting loads we end up with may last a couple of seasons. What steps should be taken to prep cases for handloading?

I really like this one because my answer will raise the hackles of a lot of folks and probably generate some mail. So be it. If you are using new, unfired cases, after safety checking them for length, all I normally do is run them through a Universal Case Expanding Die from Lee Precision to round the necks and chamfer the inside of the case mouth. This allows jacketed bullets to be seated without shaving the base off. Then, prime, load and shoot. This gives me fire formed cases for that rifle.

Some of you obsessed with case preparation will label me a heretic, but I have used cases prepped like this to hunt groundhogs and other critters that require a high level of accuracy with no problems. This method usually works fine with bolt-action rifles. When using pumps, lever-actions and semi-autos it's best to get out the old sizing die and run them through it to start.

Oh, I've been bitten a time or two using this method for thousands upon thousands of new brass, but that is what I have a bullet puller for, and the time I've saved for my initial range work has been well worth it. For all cases, check for length. If you are using your sizing dies, check after that process. If I am not using these cases in a bench-rest match, below maximum length is fine. I don't really care if some of them area couple of thousandths of an inch different from the others.

I am just checking for safety. When some of them measure over the max, I trim them all the same. If you can detect an appreciable accuracy difference in your hunting rifle by using cases like this, you area better shooter than I am. I used to jump through all the hoops concerning case prep as has been preached over and over by every gun writer in existence, until I started to experiment for what worked for me. Two things I don't do is neck turn and ream primer pockets.

I have found that most of the brass now commonly available is so precise that neck turning is a useless operation. Besides, if the neck is thicker on one side so will be the body. That case should go in the scrap pile. I have a mechanized RCBS Case Prep tool that allows me to ream primer pockets fairly easily. I don't bother. I do clean the pockets of my rifle cases with the nifty little

revolving wire brush that comes with the tool. Most of the time I don't think it makes any difference, but it makes me feel good.

For handgun rounds, forget it. I've never cleaned any of their primer pockets. I've inspected for off-center primer flash holes enough times to wonder if there ever was such a thing, but I still find myself looking at new brass to find that four-leafed mis-punched clover. I have tools to uniform the flash holes that I used to use religiously. No more. If there is any case prep option that I haven't tried, I'd like to know what it is. Just do what works for you.

If you're a fanatic who wants to spend endless hours at a job with questionable worth, help yourself. If you just want to shoot, maybe a minimalist method is a better choice. Somewhere between these two approaches will be best for you. I swear I didn't touch it! This isn't exactly a question, but how many of these have you gotten over the years. I had a guy come in with a Remington 512 .22 rimfire.

They are nice little rifles and will be seen often since they last along time with good care. "This thing won't feed right. The bolt's real sticky." I tried it, yep. "Have you had the bolt out," I asked. It's real simple to do just pull the bolt back pull the trigger

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and it comes right out. I got the answer above. As you know there is a little part called the cartridge stop that must be in an upward position when the bolt assembly on this rifle is replaced. Otherwise, feeding and operation can get a little squirrely. I told the customer I might be able to fix it by the next day. Sure enough, that was the only problem besides having half a tree full of dried leaves and other debris in the action, which I cleaned up. I didn't have to charge very much and the customer was pleased.

Six months later he was back. "This thing won't feed right. It just went bad all at once." Again I asked if he had removed the bolt or done anything else. "I swear I didn't touch it!" Needless to say I repaired the gun the same way I did the last time. I think I charged him about \$1.50 or something. I admonished him to bring it to me if he wanted it cleaned or anything else went wrong. Well, that was about six months ago. I keep looking up expecting him to appear in the shop.

I could tell him how to insert the bolt back in the rifle, and I will if he ever fesses up to having removed it, but this is too much fun. I've held this one for last, because I used to shiver when I heard it. "I just bought this rifle and it doesn't shoot worth a darn. Can you fix it?" Don't cha' love it?

How did you buy it—used or new? If new, I usually recommend sending it back to the manufacturer and let them deal with the headaches. Sometimes bad apples slip through.

Although the standard for accuracy has gone up exponentially over the years, and that most buyers expect inch groups or less, those rifles are still very far and few between. And, shooters who can take advantage of this level of performance are somewhat hard to find, too. The firearms companies have their own idea about what qualifies as an accurate rifle, and many times they just send the piece back without doing a thing to it and no explanation. Real helpful, huh? There's our dilemma.

I've seen some of these guys shooting at the range. They are so scared of the recoil and their bench-rest technique is so abominable that they couldn't hit grandma's bloomers at 25 yards. Don't ever tell one of these guys the simple truth. They all think they are the best shooters in the world and it has to be the gun's fault. I had a Ruger 77 in .257 Roberts that wouldn't shoot no matter what I tried—powder, bullets, primers, new cases. Maybe the 100 grain bullets were too short.

Maybe the 120 grain bullets were too long. Maybe this, maybe that. I free floated the barrel, recrowned it and glass bedded the action but it was the same as before. Then I bought a bore scope. It revealed that one side of the barrel had lands as smooth as out-of-aligned tires at 200,000 miles. No wonder it wouldn't shoot. Half the barrel was missing and I couldn't see that by just looking down one end. I may be a little dense but the light went on.

If someone brings me a rifle that they say won't shoot the first step is to pull out the old bore scope. If the barrel checks out, game on. If it doesn't, I take pictures of the problem and recommend rebarreling. The bore scope is not infallible. For example, it can't necessarily tell you which barrels will shoot accurately, but it usually can tell you which won't. Sometimes the barrel is pitted and shoots so well it confounds you, however, I've saved myself a lot of grief using one and I recommend it.

If the barrel looks OK, I have an accuracy package consisting of recrowning, free float the barrel, glass bedding the action, working the trigger to a reasonable crisp weight and shooting the rifle myself to compare targets with the owner. It's rare that the client is not satisfied but some people never are. At least I don't have to tell them they can't shoot worth a darn. AG

HISTORY

Development History Of The Modern In-line Muzzle Loading Rifle

The original builder of modern in-line muzzle loaders tells his tale.

BY IRVEN F. PALMER JR. OCTOBER 2013

ORIGINAL PP. 16-17

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I recently visited the local Cabela's store in Lacey, Washington near where I live and saw several hot new products in muzzle loading technology, including several new in-line muzzle loaders. Reading various sporting firearms magazines, I also have noted a few articles about modern examples of muzzle loading firearms that are so common now in sporting goods shops all over the country.

Given this popularity, I thought readers might like to know the history behind the development of the first modern looking in-line type of muzzle loading rifle. I have been a muzzle loading shooter and hunter for over 50 years. I became interested in muzzle loading for hunting and competitive shooting way back in 1950. My older brother Howard and I used to shoot several different model percussion cap firearms, both of pistol and rifle types.

He participated in some Civil War reenactments sponsored by the Multnomah Muzzle- Loading Rifle Club of Oregon. It was great fun to watch all those muzzle loading firearms and cannons in action with all that black powder smoke drifting across the battle field. Our home was near Olympia, Washington at the time. Howard, our younger brothers and I had built a 100 yard firing range complete with a nice bench rest where we would shoot all different types of rifles including the various muzzle loading types.

Firing those muzzle loading rifles hundreds of times using an excellent bench rest never produced a hundred yard group less than about four or five inches. That got me thinking. Was it the long arc eccentric hammer drop, 45 caliber in-line muzzle loading rifle designed by the author in 1963. Also shown is the three piece aluminum ramrod and its leather sheath used while hunting. At the range a wooden dowel is used instead. or perhaps the crude open sights that produced those large groups?

In June of 1950 the Korean War broke out. By August I was in the military for four long years. College on the GI Bill followed and then on to graduate school, so there were plenty of things to keep me occupied and financially broke until 1963. Howard asked me to attend another muzzle loading event in that year. I once again began thinking there must be a better design for a muzzle loader that would produce smaller groups on targets.

For weeks I started drawing different rifle designs, some of which became real firearms in later years, but that is another story. Finally, I settled on a modern in-line design where the hammer bolt traveled in a straight line to contact the percussion cap for igni-

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tion. I then set about trying to get the rifle from the design stage to a shooting prototype. This straight in-line design was created to eliminate any eccentric arc motion and cut the hammer fall time, thus greatly improving accuracy down range. I was able to complete his process in the summer of 1963. First, I obtained a .45 caliber barrel blank from Numrich Gun Parts Corporation.

Using my design plans, I had a machinist friend of mine, Vance Colyar, machine the action part of the barrel and reduce the diameter of the blank forward of the action to reduce weight. I built the trigger guard, trigger block, trigger assembly, recessed bolt and bolt handle myself in my shop. Then, I inletted the barreled action into a walnut stock and installed a Lyman ramp front sight and a Lyman model 57 WJ rear peep sight. The rifle was now ready for test firing. The results were outstanding.

I could consistently shoot 100 yard groups less than three inches and groups of two inches or less were common using the bench rest and those peep sights. I never mounted a telescope on the rifle so I don't know what those results would have been. I hunted every thing from coyotes to mule deer with that rifle and it still shoots just as good today. After the test firings and the great results I wanted to let people in the shooting fraternity know about this new in-line design for a muzzle loading rifle.

I wrote a detailed story about my rifle design and the results of the test firing and mailed it to American Rifleman magazine. The editors there were very interested, however, before they would publish the story they wanted me to ship the rifle to them so it could be examined. I believe safety was their main concern for any readers who may want to build one. So I packed up my rifle and shipped it to them. They wrote back saying they had studied the design, had tested the rifle and would publish my story.

They shipped the rifle back to me and in the June 1964 issue of the magazine my story appeared, entitled "A Modern Muzzle Loader." For over 25 years my in-line muzzle loader was the only one in existence. Then I noticed several new in-lines began hitting the market place. Now there are several new, varying designs on the theme. That's OK. I know that I developed the very first one and it still shoots great.

I also drew up the design for similar in-lines and built in-line pistols, as well as several other types like under-hammer designs. But those are different stories. I should mention that test firing to produce such good results on target didn't just come quickly. At first I was In the center is the author's original in-line muzzle loader.

The upper rifle is an under hammer design and the pistol at bottom is an in-line .45 caliber. using round balls of about 140 grains and FFg black powder and could not improve much better than a three inch group. I then tried a series of conical bullets from about 200 grains to 450 grains of various design shapes. The slow twist of the barrel would not stabilize the very heavy slugs. I finally settled on a 245 grain lead conical bullet with three large lubricated grooves ahead of 75 grains of Pyrodex RS.

In addition, I found that for best accuracy it is essential to clean the barrel after each shot. Of course when you are hunting you don't have to worry about this if you need another quick shot. Also, a consistency of loading procedure is very important. For instance, clean the barrel and dry after each cleaning. Pour in the powder charge. Push the bullet down on top of the charge with the same force each time.

Finally, tap the bullet on top of the charge with one rap of the ramrod, trying to do it the same each time. What you definitely do not want to do is leave an air space between the bullet and powder or have a loosely packed charge prior to ignition. The designer of the first modern looking in-line muzzle loading rifle is still alive and kicking. He is also still shooting that very first in-line muzzle loader. AG

HISTORY

Inexpensive 1911 Safety Upgrades

Even the cheaper 1911s can be made more reliable with these upgrades.

BY ROBERT K. CAMPBELL OCTOBER 2013

ORIGINAL PP. 18-22

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During the past decade or so we have been spoiled with ultra reliable, very modern 1911 handguns. While they are good examples of the gun maker's art they are not perfect and the classic 1911 problems sometimes show up in these handguns. Ever more often we see hard used foreign produced pistols in the shop. Everyone cannot afford a thousand dollar pistol. Handguns priced in the four hundred dollar range are very popular and probably constitute the majority of 1911 sales.

They are of cast construction rather than forged, which is fine if properly done, but the internals often leave something to be desired. As such they are fertile ground for improvement or generally simply bringing them up to reliable function. Recently I had the opportunity to extensively test and fire a number of Philippine manufactured 1911

handguns. While the experience was generally satisfactory, there were drawbacks in some of the pistols.

The metallurgy is fine and barrel and safety fitting is usually OK but occasionally a small part wasn't fitted correctly. Less often there is a major problem in fitting. Most of these problems take a gunsmith back to the 1970s when there was a constant flood of GI guns to keep us busy. The Philippine pistols are comparable in many ways to the GI .45 but there are differences. While working with the extractor and feed ramp is required for function, insuring the pistols are safe to use is also important.

On several occasions I have encountered an ATI pistol that was equipped with a slide lock safety that simply did not require enough effort to move to the off position. The indent was not positive and this was a cause for concern. The trigger action was fine, albeit heavy, at six pounds. The grip safety seemed to work properly, releasing

the trigger about half way through the grip safety's travel. However, the slide lock safety was another issue.

My first thought was poor fitting of the safety but a bit of thought revealed the true cause of the light thumb safety action. The plunger was putting insufficient friction on the thumb safety. The plunger tube itself was fine and properly lined up. I replaced the plungers and springs with parts from Brownells and the ATI now seemed on a par with other GI .45s. However, even after this expedient the slide lock safety engagement, while improved, did not have the rigidity I wished to see in a defensive sidearm.

Several avenues of improvement were explored. The safety seemed to be properly engaging the cut out in the slide. After all, if the thumb safety was not in the proper locking position the plunger could not engage the slide lock safety. The safety seemed to properly engage in the

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slide cut out, however, the plunger did not seem to be bearing against the ATI pistol's thumb safety in the same manner as a Rock Island Armory pistol used for comparison. The decision was made to slightly relieve the safety. This is comparable to putting a dimple in the slide lock where the plunger contacts the slide lock in order to be certain the slide lock engages the slide properly and locks the slide back.

We were looking to be certain the thumb safety—or slide lock safety as it is sometimes called—was offering a positive indent. Only slightly relieving the thumb safety seemed to give a tighter fit. The slide lock safety now was higher and allowed The old style found

on GI guns is more likely to end up in the shop. Many modern GI pistols offer comparable performance to the old Colt. the plunger to take the proper bite. Another fix would be to fit a properly designed thumb safety such as from Wilson Combat.

Just the same, some prefer a GI thumb safety. Next, we decided to take a look at the firing pin. The weak plunger spring gave cause to believe that perhaps other springs were substandard. An extra power firing pin spring is an important safety feature. Not only does the firing pin spring retract the pin in an inertia type system after firing, it also prevents the firing pin from taking a run forward if the pistol is dropped on its muzzle.

Most modern 1911 pistols have either some form of firing pin block or utilize an extra strong firing pin safety. The ATI appeared to have neither. The pistol was fitted with a Wolff Gunsprings heavy duty firing pin spring and a Wilson Combat Series 70 firing pin. This neatly enhanced the pistol's safety and gave the owner peace of mind as well. A problem observed in a RIA pistol was a clocking extractor, meaning the extractor moved in the extractor tunnel. Anew extractor might be one cure.

In this case, the extractor looked fine but the firing pin stop was loose. The pistol functioned but brass was thrown back into the shooter's face. It could have

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been peened for improved fit but a Wilson Combat over sized firing pin stop was fitted. Filing was minimal and in the end a good tight fit was achieved, giving more expense but cheap life insurance in a carry gun. The RIA guns are pretty decent with the ATI guns trailing behind in my experience. The RIA guns occasionally have a problem extractor while the ATI guns have bad magazines.

Poor ammunition coupled with a cheap gun is often asking for trouble and in these days of shortages there are plenty of ammo makers that are on the wrong side of the road in quality. A good crimp and proper sizing of handloads is essential but many novices don't seem to get it. Recently, I had a rather simple problem come into the shop. The magazine didn't eject when the magazine button was hit. The problem was that the trigger bow was contacting the magazine.

In this case, the bow was filed but replacement may be needed. A slide lock failing to lock open is often handled much in the same manner as our earlier project by adding anew plunger tube spring and ends. Break in with proper lubrication is always important. I use only high quality ball ammunition for the first one hundred rounds so as not to be confused to the source of any malfunction. As an example, Hornady's 230 grain ball and Wilson Combat magazines will feed in any pistol that isn't completely sick.

Another issue sometimes seen with the foreign guns is an improperly fitted grip safety. Some shooters are used to the beavertail design and don't like original design. A two thumbs forward grip technique can raise the palm off the grip safety, resulting in a failure to engage. Don't deactivate the grip safety. Instead, make it easier to activate by tuning it. First, understand how the leaf spring works.

If you look from the back of the 1911 you will note that the leaf on the right pushes to the rear and exerts pressure on the grip safety. You may bend the leaf forward to reduce the pressure needed to depress the grip safety. Care must be taken in this modification as you may increase the likelihood that the inertia of the grip safety would overcome the spring in the case of a dropped pistol.

Perhaps this modification should be limited to a competition pistol such as a Wild Bunch-class handgun for Cowboy Action competition. The grip safety doesn't really need much pressure to be activated but it does need movement. Remember the contact area is where the bump on the grip safety contacts the trigger stirrup. Replacing the grip safety is another, more expensive option. I have had any number of 1911 pistols come into the shop that simply needed to be lubricated.

Many anew 1911 owner has mistakenly blamed his 1911 for function problems when the true culprit was a lack of lubrica-

tion. If the pistol malfunctions from the start, the pistol is at fault. If it fires a magazine or two, then begins to malfunction, you have neglected proper lubrication. When preparing the pistol for carry, a light amount of lubrication is fine but use adequate lubrication when engaging in along range session and firing substantial amounts of ammunition.

The long bearing surfaces, the barrel hood and barrel bushing as well as the cocking block on the bottom of the slide should be lubricated. I normally lubricate the slide rails, the area on the barrel around the barrel bushing, the barrel hood, the disconnect and let oil soak into the area in front of the cocked hammer. Safety Check And Overview It is a shame but sometimes the safety operation of 1911 handguns leaves something to be desired.

The home gun butcher is responsible for a lot of this type of action but, occasionally, so is the haphazard factory worker. To check the safety we rely upon a method first used probably around 1912. Check to see that gun is not loaded. The hammer should be cocked and the thumb safety on for the first check. While pressing the grip safety, pull the trigger. The hammer should not fall. Next, try to move the cocked hammer to the rear. It should show no movement.

IF A FAINT CLICK IS HEARD, THE SEAR MOVED SLIGHTLY WHEN THE TRIG-

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ger was pressed with the safety on. One particular brand of 1911 has this problem a lot, even though the trigger action is sometimes good. The safety is quite soft and spongy on these pistols. Replace with quality aftermarket parts. Magazines are the heart of the pistol. GI magazines were, and are, fine for hardball ammunition.

Modern magazines from Wilson Combat present the cartridge nose at a higher angle in relation to the feed ramp and chamber, providing greater feed reliability as the bullet nose is fed directly into the chamber. The factory supplied magazines with the ATI pistol are sometimes problematical. RIA pistols usually feature serviceable magazines having been supplied by outside vendors. Brownells offers a special magazine latch for those troublesome clone guns that are not quite up to specifications.

This part raises the height of the magazine in the magazine well, moving the magazines feed angle more in line with the chamber, a small thing that may cure feed related problems. I recently fielded a once common 1911 question. Why won't the slide stop drop on an empty magazine? According to Wilson Combat's FAQ: Typically this is caused because the magazine is new. The forward portion of the polymer follower has not rounded enough to disengage the sharp edge of the magazine.

To correct this simply depress the follower with one finger and with another finger push the rear of the follower forward slightly, between 5 and 10 times. The slide should now drop on the empty magazine. While the

new style follower in our premium magazines cures most feed problems, often we find a rough feed ramp. Polishing or throatening the feed ramp may be done carefully, patiently, by a skilled hand. The important thing is not to cut too deep, causing an unsafe condition with insufficient case head support.

The chamber mouth must be carefully radiused, preserving but smoothing the step between the ramp and the barrel. Apart of the polish often overlooked is that the chamber should be polished. The bullet or cartridge case mouth bumps into the top of the chamber. This area should be smooth to allow the bullet nose to transition from the feed ramp to the chamber. Extractors can be a reoccurring problem with older M1911s and some new production pistols.

Being a fairly inexpensive replacement, there is no reason to go cheap on this one. Just the same, the extractor is often made of inferior steel instead of good quality spring steel. Abuse is probably the culprit more often than wear when a M1911 extractor malfunctions. If the extractor is abused by dropping the slide on a chambered cartridge, forcing the extractor to jump over the rim, excess wear can ruin the extractor. It is not designed to jump over the case rim in this manner.

The spring steel is overstretched and the extractor claw will be forced too far outward to work properly. Far The GI pistol isn't complicated by a tight barrel bushing or a full length guide rod. A temporary field expedient is to remove the extractor, place one

end in the extractor slot, and bend the extractor to its original position. This may restore the extractor long enough to finish a match. The replacement extractor has to be fitted to the particular pistol.

While the 1911 is supposed to headspace on the cartridge rim, in reality the extractor controls headspace in most inexpensive handguns. The breech face doesn't get much attention unless it is rough and in need of polish. Check the firing pin tunnel and breech face occasionally for debris and shavings. Polish as necessary but be careful not to relive the firing pin hole. Springs should be replaced periodically, just as you replace shocks on a car.

When the recoil spring has lost an inch or so of its free length, it is time for replacement. I have used Wolff springs for so long with such good results I seldom use anything else. A 16 pounder is good for most uses but heavy duty .45s that digest a regular diet of +P or "pin" loads are fitted with a 18 pound spring and still function fine with hardball. The recoil spring should be replaced every 3-4000 rounds as a rule of thumb, an inexpensive investment in reliability.

Magazine springs should be replaced from time to time, although they are longer lived than recoil springs. Recoil springs are flexed every time the slide is racked whether the piece is loaded or not. The plunger tube and slide stop occasionally break in high round count pistols but seldom cause a pistol to stop working. It is not known for the slide stop to protrude

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Potato Head of pistols. Give a gunsmith a frame and parts and he will give you a shooter. into the magazine well and catch the tip of some bullet styles. Filing the end of the stop will cure this problem. A slide stop may wallow in the link due to a poor fit. An oversize slide stop will cure this problem. I do not mean oversize as in an enlarged speed-type slide stop but one with a greater shaft diameter. I have used the Chip McCormick brand with good results.

Keep an eye on the plunger tube as it may need to be restaked or replaced as the round count reaches 10,000 rounds of fullpower ammunition. It is a good idea to maintain grips near the original specification to support the plunger tube. Smith and Alexander is a good choice, stronger and more attractive than the factory product. Avoid plastic grips that do not support the plunger tube.

If it doesn't have a tight fit, the firing pin stop may drop out of place during recoil, releasing the firing pin and tying the piece up. In some extreme cases the firing pin and spring may even take flight! This was much more common with GI 1911s than nowadays. You can peen the firing pin stop for a tight fit. Check the fit by removing the stop, firing pin, and spring, and then reinsert the stop only in its channel. If it falls out when there is no pressure from the firing pin it should be more tightly fitted.

A common problem is too-long grip screws or a worn out grip screw bushing that allows the grip screw to protrude into the magazine well, making insertion and removal of the magazine difficult. Wilson Combat grip screws and bushings area safe bet to avoid this problem. When you are using the special slim-line grips from Wilson Combat that have proven so popular, be certain to use the proper size short grip screws and bushings.

Gunsmiths use aftermarket trigger and action parts to achieve a clean, crisp break and quick trigger reset. If you desire a clean break of four pounds or less, use top quality internal parts. Wilson Combat and Ed Brown are among the leaders in this field. The standard parts may be of good material, as in late model Colts, but sometimes they are of materials not well suited to refinement, especially in the cheaper or foreign made 1911s.

A little cleaner action by polishing is one thing, reducing engagement surface another. The smoothest, lightest trigger demands a trigger, sear, disconnector and perhaps a custom grade hammer as well. Full length guide rods were designed to improve cycling and keep the recoil spring from binding up. Increasing accuracy is not the intention, but one could slightly improve accuracy by helping slide lockup.

According to Jim Clark Jr., the fulllength guide rod is probably at its best when using loads that would "kink up a regular spring like a chainsaw" The guide rod enhances reliability as long as the user does not let the additional complications of the device and pistol take-down deter regular maintenance. Improving Accuracy While some may not wish to spend the money on an inexpensive pistol, I have had excellent luck with Bar-Sto barrels in the Philippine-produced RIA pistols.

To obtain maximum accuracy a match grade barrel and bushing can be installed and combined with a tightened slide to frame fit. An improved trigger pull and sights will make it easier to produce maximum accuracy with your pistol. A Group Gripper Kit from Wilson Combat can easily and inexpensively improve accuracy. This utilizes a special barrel link that engages a leaf spring located in the head of the guide rod which forces the barrel into the locking lugs under heavy spring tension.

This results in a more consistent lock up from shot to shot thus producing improved accuracy. While it isn't possible to bring these inexpensive pistols up to Kimber or Springfield performance they are certainly capable of improvement. Hobby shooters on a budget will purchase these pistols, use them hard and sometimes break them. They will find their way into our shop and basic 1911 procedures will get them running again and running better. AG

TOOLS & FIXTURES

Reader Forum

BY AMERICAN GUNSMITH EDITORS OCTOBER 2013

ORIGINAL PP. 23-24

Scoping A Mauser I read your article "Scoping 1896 Mauser Actions" by Wendell Deaner in the August 2013 issue and thought it was pretty good, however, I have had some issues in the past with the drilling jig you used. I have drilled two Mauser 98 actions with this same B-Square jig and the rear base is canted to the left.

This causes the scope to not be close to center of its adjustments and is an issue when shooting longer ranges, though for typical hunting situations it doesn't really matter provided there's sufficient range of adjustment for initial zeroing. At first I thought it was me or the jig, but I have an action that was done by another gunsmith on a milling machine (an Interarms Mark X that is factory drilled and taped) and it is canted the same as the two I drilled myself.

I have tried to turn the base around but to no avail. I have put adjustable rings on as well as carefully filing the high side of the base off so that it will "roll over" and orientate straight up and that seems to work. Have you experienced this before? I use Weaver bases and have never had any problem with them. You also mention rumors of actions too hard to drill. In my limited experience with Mausers I have never seen this and only one time with an Enfield did I ever have problems.

After I spot annealed the area to be drilled, things were fine. Someone once told me that you can almost always drill a hole even if you have to use a carbide bit, but you can't always tap it. Love the publication and get lots of little helpful hints and tips from it. Michael Malenovsky Author Wendell Deaner responds. Thanks for your kind words about my article and thanks for reading our magazine.

I checked the latest Mauser 96 I drilled and tapped using the B-Square jig and the problem you described does not show itself. It was not exactly clear from your letter if you mean the scope base is out of

alignment from left to right or if the base is tilted with one side higher than the other. In the first case the only cause of this would be the jig tap guide holes are drilled off center. If so, that is a factory problem and good luck with that, since the jig is not produced anymore.

I checked mine with Brownells sleeved scope alignment rods and it is well within spec. If your base is tilted, the stripper clip guide on the top of the receiver may not have been ground to match the original contours and will not fit the base properly. I used a #55 rear base and it fits pretty well, especially after it is tightened to the receiver. The two holes should go exactly in the middle of the slot for the guide rail of the bolt on top of the receiver. If they do, your base is where it should be.

I mentioned the hardness issue only in passing and have never seen one either. Your letter inclines me to believe you are knowledgeable and experienced in your trade. I don't doubt that you are having a problem; I just can't duplicate it with my equipment. Perhaps some of our other readers will comment. Green Mountain Barrels Like Wendell Deaner, I own and shoot a T/C Renegade (several, actually) so I was interested in his article, "Thompson Center Renegade Upgrade," in the May 2013 issue.

My experience with these rifles and two accompanying Green Mountain barrels has been different from his but, as they say, your results may vary. I would, however, like to suggest another solution to the problem of a loose barrel lockup, without resorting to, as we called them in one shop I supervised, "caveman tools." Remove the lug, drill and tap a hole for a machine screw (your choice of head/thread) in the bottom of the lug. Install the screw and attach the lug to the barrel.

Fit the wedge by filing the head of the screw. After you have achieved a snug fit, Loctite or stake the screw in place if you wish. You might also, if you have suitable

equipment, place a spot weld in the same place and fit in the same manner. I prefer the screw as you can easily replace it if you file too far. Either way, I believe that this is a more elegant approach to the problem. Brian Leavy Author Wendell Deaner responds. Thanks for reading and for your comments.

Even though I have not tried it your fix seems to be a good one. However, I would suggest a better one that I will use in the future if necessary. Green Mountain Rifle Barrel Co. is a reputable company, and I don't think the problems I mentioned are too common. I think contacting them for help in this matter would be the best thing to do first. If I hadn't been in a hurry, and if the gun had not been my own, that is what I would have done. I'm sure they would be more than willing to work with their customers.

As far as caveman tools go, I'm guessing that you don't ride a Harley-Davidson motorcycle like I do or you would know that almost any problem can be fixed with a large screwdriver, a cold six pack and a very big hammer (sometimes a little duct tape can help.) Thanks for your comments and good luck with your gunsmithing. Ammo Drought I was impressed with the numbers and reasons for the ammunition shortages we've seen lately.

I live in a small community (500 or so) and do a lot of gunsmith work for people in town and the surrounding areas. We have at least our share of varmints to shoot at, so don't often require a regular shooting range. I have one of my own, 60 yards long, and some folks have even longer ranges on their property. Trouble is, we use our share of ammo of all types and replacing ammo means a drive of about 70 miles round trip to stores that now have nearly empty shelves. I'm not talking just .22s either.

I'VE SEEN SOME AMMO WITH NAMES I'VE NEVER HEARD

READER FORUM CONTINUED

ORIGINAL PAGE 24

of from countries I can't pronounce, but not the standby stuff I prefer to shoot. I'm too old to try the other stuff and couldn't reload a .22 rimfire if I wanted to! Last I checked, Brownells won't even back order ammo but will tell me when ammo is available for backorder. I'm currently backordered on ammo I ordered in February and haven't heard a word of encouragement yet. Gun shows are selling ammo at obscene prices and I won't touch it, and in fact have stopped going.

Whatever folks are hoping to achieve by hoarding and gouging is going to come back and bite them one day. In the meantime, I'll use my subsonic ammo with care and only where needed, target practice with my pellet gun, and rely on my .45 for everything else. Thank you for a great explanation of a serious problem and keep up the great gunsmithing articles. They help me a lot. I hear you.

The Army Reserve Marksmanship Program was forced to cancel an ammunition contract established early this year because the vendor was unable to obtain sufficient components to fill it. We were scraping and redistributing at Interservice and the National Matches to make sure everyone had enough to compete with. Industry friends have told me manufacturers are starting to catch up and light is appearing at the end of the tunnel.

Being a belt-and-suspenders sort, I manage ammo like finances and keep something set aside for rainy days. I plan to compete in some shooting discipline for decades to come, so it's not like my supply will ever go to waste! Winchester 1890 I'm working on Winchester model 1890. It is a second model, blued, serial number 1767xx, marked 22 long on barrel. Is it possible to shoot .22 Short in it? What about .22 LR? While it is possible to fire .22 Short in a rifle chambered for .22 Long don't fire them very often.

Mike Lusby Extensive use of the shorter cartridge can erode the chamber making extraction of the longer case difficult. The cavitation, or enlargement, can eventually

make extraction so difficult it can't be accomplished without mechanical assistance, meaning the application of a six or eight ounce hammer to get the charging slide and action bars moving to the rear. We think you have a "for real" shooting gallery gun in for service.

Most of these long-gone attractions relied on guns intended for the .22 Long or limited to the .22 Short in an effort to hold down noise and ricochets. Besides, it didn't take more than those velocities pushing a 39 or 40 ounce pill downrange to knock over a slow moving tin duck, ring a bell hiding behind a bullseye or convince a papier-mâché clown's grinning open mouth to partially inflate a balloon. Ah, those were the days. What about .22 LR?

As long as it's not hyper velocity, far less accurate than standard velocity for target use, we can see no reason why not. Except, not all .22 case rim thicknesses are the same. They'll vary from brand to brand. Select a .22 Long, measure its rim thickness and be sure the .22 LR chosen matches it. This will help eliminate extractor glitches as long as you keep the extractor cut in the breech face clean. Kel Tec Sub-2000 I have a customer that has a Kel Tec Sub-2000 in .40 S&W and the plastic barrel hinge is broken.

Have you done an article on this gun? The part is screwed on. Will it require heat on the knurled sleeve to remove? The knurled sleeve was inside of the plastic hinge. R. J. Litchfield Sam Caudell No articles as yet, however, we would not recommend applying heat to a plastic, or polymer, joint. As for the presence of a screw, contact Kel Tec and secure an owner's manual. The schematic it contains will quickly confirm or deny the existence of the screw.

We repeat our recommendation against using heat on what you refer to as a "knurled sleeve." We assume it is metal and could easily transmit sufficient degrees to weaken or warp the surrounding hinge material. AG

SEARCHABLE ISSUE RECORD

Archive index

Crowdfunding American Gunsmith Editors	2	Development History Of The Modern In-line Muzzle Loading Rifle Irven F. Palmer Jr.	16-17
Working The Ruger P89 David W. Manney	3-5	Inexpensive 1911 Safety Upgrades Robert K. Campbell	18-22
Custom Rimfire Handgun Cleaning Rod Norman E. Johnson	6-8	Reader Forum American Gunsmith Editors	23-24
Requiem For A Gunsmith, Part Two Wendell Deaner	9-15		

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