



MAR 2013

DIGITAL ARCHIVE
EDITION

PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

A TECHNICAL JOURNAL OF CRAFT, REPAIR & RESTORATION

03

ARCHIVE ISSUE NUMBER

INSIDE THE ARCHIVE

TRACKING POINT

INVITE SOMEONE TO SHOOT • THE WINCHESTER MODEL 1887 • COLT GOLD CUP • SAVE YOUR RECEIPTS!

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 111

DIGITAL ARCHIVE EDITION

Preserved for the bench.

This edition presents the original American Gunsmith editorial work in a modern, searchable layout while preserving its issue, author, and source-page history.

ABOUT THIS EDITION

The article text comes from the original issue and has been reflowed for legibility. Obsolete subscription, ordering, association-service, and house-advertising pages are not reproduced.

Original article images appear only where permission has been confirmed. All other image positions remain visibly reserved so approved art can be restored without rebuilding the issue.

Report corrections or rights information to editor@gunsmithmag.com.



AMERICAN GUNSMITH

DIGITAL ARCHIVE EDITION • MARCH 2013

ISSUE RECORD

ORIGINAL DATE	March 2013
VOLUME	Archive volume not stated
ISSUE NUMBER	03
SOURCE ID	ag-4a0d24375c94ba6d1d6fe961

DIGITAL EDITION

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

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

IN THIS ISSUE

Contents

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

2 Invite Someone To Shoot
AMERICAN GUNSMITH EDITORS • ORIGINAL PAGES 2

3 The Winchester Model 1887
CHICK BLOOD • ORIGINAL PAGES 3-6

7 Colt Gold Cup
ROBERT K. CAMPBELL • ORIGINAL PAGES 7-10

11 Save Your Receipts!
JOSEPH REICHERT • ORIGINAL PAGES 11-13

14 The Relationship Of Barrel
Extension Diameter To Accuracy In
The AR-15, Part 1
JOE CARLOS • ORIGINAL PAGES 14-17

18 Tracking Point
JOHN M. BUOL JR. • ORIGINAL PAGES 18-22

23 Reader Forum
AMERICAN GUNSMITH EDITORS • ORIGINAL PAGES 23-24

FROM THE ARCHIVE

Invite Someone To Shoot

BY AMERICAN GUNSMITH EDITORS MARCH 2013

ORIGINAL PP. 2

Shooting and gun ownership will last only as long as our interest. More people with positive gun and shooting experiences will lead to more support for guns and shooting. The best way to raise this is to directly invite new people. The National Shooting Sports Foundation created the following list of reasons to send those invitations based on their recent surveys and studies. Build the Base: Where will the next generation of sportsmen and women come from who will support our firearms, hunting and shooting freedoms?

Of course, they will be the ones who you introduce to our sports today. Invite someone to hunt or go shooting. More than 90 million adults in the United States 18 and over expressed at least some interest in participating in hunting or shooting, according to NSSF/Harris polls. The top factor in getting them to participate was an invitation from a friend or family member.

Peer Power: Approximately 15 million youth who are not hunters or shooters and are between the ages of 8 and 17 would consider giving these activities a try if asked by a peer, according to a study commissioned by the Hunting Heritage Trust and NSSF and conducted by Responsive Management. Youth who are already in shooting programs should remember that their friends are waiting for an invitation to give shooting or hunting a try under adult supervision.

Approval: Approximately three-quarters of youth and adults approve of hunting and target shooting, so it is not surprising that people are purchasing firearms and participating in the shooting sports in record numbers.

Safer Than Golf: Hunting is safer than golf and many other sporting activities, according to injury statistics. Shooting on the range is safer still. Giving Back: Educate a new hunter that he or she can donate venison to charitable food outlets to help feed those in need.

Hunter donations make possible about 11 million venison meals annually. Also, by purchasing firearms, ammunition and hunting licenses, sportsmen and women contribute more than \$1 billion annually to protect wildlife and habitat and fund shooting range development. This funding mechanism has helped restore populations of species such as the Wild Turkey and White-tailed Deer that were struggling to survive 100 years ago.

Elevate Ethics: Firearms ownership and participation in both hunting and target shooting help youth and adults develop an ethical, responsible approach toward wildlife and wild places, and toward firearms. Learn more at www.nssf.org/lit/Ethical_Hunter.pdf Did You Ever Consider?

With their newfound knowledge and perspective on hunting, target shooting and firearms ownership, newcomers can respond to misinformed statements about these topics at work and social gatherings with a simple, "Did you ever consider this?" NSSF provides a free and easy way to ask someone to join you on your next outing. Send a themed postcard by email from the NSSF's Invite Someone to Shoot page (nssf.org/shooting/invite).

MEASUREMENT & INSPECTION

The Winchester Model 1887

PW87 from Century Arms.

BY CHICK BLOOD MARCH 2013

ORIGINAL PP. 3-6

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1696-P03-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1696-P03-F01

Back in the day, when few US Marshals were as big as Matt Dillon and even fewer saloon owners as hot as Miss Kitty, there was a guy riding shotgun on every stage coach in or out of town. The gun carried across his lap was usually portrayed on TV and in movie westerns as a 10 or 12 gauge double. Frequently, it had drastically sawed off barrels. I shouldn't have to remind you that a pump shotgun with a legally short barrel (18 inches) has become favored by many as an ideal home defense gun.

First, it is among the most devastating of close-in weapons. Secondly, should any household member be shy of firing it, the easily recognized sound of a pump being cycled can scare off all but the boldest, or dumbest, intruder. Yes, I speak from personal experience here. If there was a limitation to the fearsome double gun it was its capacity of two rounds at close range. "Close" can be defined as anything from about 40 yards away from a violently moving stage to a bandit hanging on the coach itself.

When sawed-off barrels were present the 40 yards might be expecting too much even when 00 buck was the load. There was another factor, but this one not based on personal experience but resulting from frequent observation of motion pictures and televised images. Bad guys wearing black hats rarely attempt to rob a stage coach

solo. They move in on their objective as a group that most often exceed two dusty and highly hostile types wearing kerchiefs over their scruffy faces.

So the folks riding shotgun, the companies they rode for and LE guardians of not Designed by John Browning, it was the first truly successful repeating shotgun. It was a lever action at the insistence of Winchester and the immediate successor to the Winchester 1901, a stronger, 10 gauge smokeless powder version. Quite peaceful towns started looking around for more firepower. Primarily in response to their search the first repeating shotgun came to be: The Winchester Model 1887.

It was a lever action despite the recommendation of its designer, John Browning, that it be a pump. At the time company thinking was that Winchester was known well for its lever actions, such as the Model 1873 and others, and wished to capitalize on that reputation. Browning dropped his suggestion accordingly and developed a breech loading, rolling block lever gun chambering the black powder 10 and 12 gauge shells of the day.

When smokeless powder was introduced as a shot shell propellant it became apparent the action of the Model 1887 wasn't strong enough to withstand the extra power. A redesign gave birth to the Model 1901 in 10 gauge only. Winchester chose not to offer the 1901 in 12 gauge due to the success of

their then-current 12 gauge pump, the Model 1897. Another Browning design and commonly credited with the overall popularity of pump guns then and now, the '97 had succeeded his Model 1893. It seems Mr.

Browning was right after all. No surprise there. Despite the appearance of the self loader and the recent introduction of some .410 lever actions, large gauge pump action sales have far outdistanced their competition. Before getting into field stripping, which goes farther with the 1887 than required for most guns, a few technically oriented items should arouse interest. Century Arms has named their import the PW87.

It is a lever action falling breech block action in 12 gauge with a 2.75 inch chamber, 19 inch barrel length with modified choke and a magazine capacity of five rounds. In states limiting magazine capacity the PW87 can be reduced by installing a plastic or wooden rod within the tube to make hunting with the shotgun legal. The trigger pull, as listed in the owner's manual, is 8-12 pounds. The manual further advises a slow and steady pull on the trigger be used.

Well, excuse me but an 8-12 pound pull is entirely too heavy and the advice given on slow and steady is inaccurate. As you serious scatter gunners know, when going after birds of the live or clay variety you don't use

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1696-P04-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1696-P04-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1696-P04-F02. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1696-P04-F02

a “slow and steady” pull. You “slap” the trigger. Slow and steady may be dandy when the target is stationary and time is no factor but when a fast rising pheasant is taking off or a clay is crossing the firing line just as fast you have to swing the barrel to lead the bird, forget about holding a sight picture and concentrate on pointing instead of aiming the gun. The dedicated live bird seekers I know preach and use the slap or smack. They seldom come home without dinner.

Most have broken 100 clays in a row on more than one occasion and have the trophies to prove it. Success begets respect, so mentioning the departure from a slow and steady pull on the trigger to a slap isn’t inappropriate here. Which approach is employed always depends on what’s happening out beyond the gun muzzle. Field Stripping An empty chamber, a likewise magazine and the wear of eye protection are required as usual.

At this point, removal of the stock isn’t necessary, however, if detailed disassembly lies in the guns immediate future you might as well do it sooner than later. The tang screw (19) secures the butt stock to the receiver. Back the screw completely out, grasp the stock and pull it off to the rear. Holding B A The fork interfaces with the groove.

Mark the right (C) and left (D) cartridge guides to assure correct reassembly. on to the stock firmly as you gently move it up and down while pulling often makes the separation easier. Get too violent and there’s danger of splitting the wood so go easy with the up and down stuff. In this case, a slow and steady pull is the right thing to do. It matters not whether you have removed the butt stock or left it attached for field stripping. To finish up with detailed disassembly it has to come off.

Rotate the lever down all the way to move the breech bolt to the rear and open the action. There’s Ca cartridge guide screw (13) on each side of the receiver located aft of

and above the lever axle pin (29). Loosen but do not remove the left side screw. Long nose pliers are applied to compress and remove the hammer spring (25). Using the proper size punch, drift out the lever axle pin.

In the following order remove the left cartridge guide screw, the right cartridge guide screw and withdraw the breech bolt assembly down and out of the receiver. If the shotgun has been reasonably cared for the only cleaning the assembly may need is a flushing out, blown air drying and light lubrication. If seriously dirty, you’ll have to go deeper and into detailed disassembly. I’ll get into that.

First, before removing the breech assembly from the receiver prepare yourself with a parallel side punch that just fits in and easily spans the cartridge guide screw holes. Add to that an extra fine point felt tip pen. The instant those C The axle pin cannot be drifted out while the hammer spring remains in the breech block assembly.

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1696-P05-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1696-P05-F01

holes appear in the removal of the bolt assembly run the punch through both holes. If it extends beyond the left side hole, that's good. Hold the guides in place. Now mark each guide. One with an "R" the other with an "L." Despite there being an obvious physical difference between the two guides, the time used to mark both is well spent when the time comes for reassembly. Detailed Disassembly As you're going through this take a magnified look-see for burrs, rough machining or rub marks inside the receiver.

The latter are usually accompanied by matching marks on the part doing the rubbing. I found nothing serious, meaning worrisome, in the PW87 I received. Any imperfection I did discover was eliminated by carefully stoning it with a fine Arkansas stone. After the masonry work was complete any grit it left behind was air blown away. When you drifted out the lever axle you freed the hammer (49). Right now it's probably rattling around loose inside the bolt. There's no reason it should stay where it is.

When it was removed, I saw right away the axle wasn't a roll pin. I wasn't positive the manufacturer hadn't used any roll pins at all in B C A the shotgun I received or had altered their plans and installed them in later models or was planning to do so. This forced me to include a check of every pin in the gun during my magnified examination.

If one was spotted removing it would require a roll pin punch. I suggest you avoid complications and do the same as I. You can start with the firing pin retaining pin (37).

Mine wasn't a roll pin but yours might be. Place a finger over the firing pin tunnel at the rear of the bolt. When the retainer clears them, the firing pin (39) and its spring (38) may be tempted to flee backward. If they remain in place you can pick them out. Alternately, a rearward tilt of the bolt followed by a tap on your bench could jar them loose. After both parts have been taken from the bolt, dip a pipe cleaner in solvent, then run it back and forth in the vacated firing pin tunnel a few times.

Reverse the pipe cleaner or use a fresh one to dry and lightly lube the tunnel. By the way, pipe cleaners and paper clips are handy to have standing by in any tool inventory. That felt tip pen can get back into this act. Use it to place a dot on the left extractor (35) to differentiate. Not pictured is the trigger spring which lies within the upper tang. it from its right hand partner (36). They must not be reversed in reassembly. To remove them both you need a very small blade screwdriver or similar tool.

Insert the tool between the extractor and its detent (34). Push the detent to the rear to compress the extractor spring (33). Lift each extractor in turn to remove it from the bolt. Place the two extractors in a magnetic

parts tray. Control the detents and spring in removal after the extractors have been lifted out. Only two components remain attached to the breech bolt, the cam (31) and its screw (32).

I say two more parts but, by this time, I believe the lever (26) subassembly has probably slid out of the bolt on its own. In a badly fouled or horribly mistreated PW87, check out the lever spring (27) after backing out its screw (28). This does it for the breech block and lever assemblies but work remains in the tang area. One of the features making the PW87 a slightly different animal than the original 1887 is a lever locking system.

For those present day scattergun fans whose great grandpas used to ride shotgun or patrol the dusty main streets of the Wild West, the lever of early model 1887s had to be held upward tightly against the butt stock to prevent the lever from dropping downward. If the drop was sufficient there was a chance the breech bolt would open far enough to cause a misfire of an already chambered shot. To avoid the misfire the action would have to be fully cycled again. Not good in a time-is-critical situation.

You can begin disassembly of the lever lock system by drifting out the trigger pin (17). The trigger (40) will fall free. Unless there is a dire need for replacement I'd leave the lever lock (23) alone because its locking

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1696-P06-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1696-P06-F01

pin (24) is staked in. The trigger spring (20) may have abandoned the tang when the trigger fell. If not, it has no reason to remain there. Neither do the lever lock spring screw (21) and spring (22). There are right (7) and left (48) forends on the PW87. Assorted escutcheons (2), washers (46) and two screws (45 & 47) hold them together.

Need I say more? 1 Magazine Locking Screw 2 Barrel Band Screw 3 Barrel Band 4 Magazine Plug 5 Front Sight 6 Barrel 7 Right Forend 8 Forend Escutcheon (2) 9 Carrier Pin 10 Carrier 11 Cartridge Guide Pin 12 Right Cartridge Guide 13 Cartridge Guide Screw (2) 14 Receiver 15 Shell Detent Screw 16 Cartridge Guide Screw Stop 17 Trigger Screw Pin 18 Trigger Spring Screw 19 Tang Screw 20 Trigger Spring 21 Lever Lock Spring Screw 22 Lever Lock Spring Yes.

If you haven't noticed by now the thumb piece of the hammer is almost non-existent. This makes setting the PW87 on "safe," which is by half cocking the hammer, less than 100% assured. What thumb piece there is may have to be built up achieve that level of reliability.

It depends entirely on the owner but be prepared for adding to, rounding off and refinishing a model PW87 23 Lever Lock 24 Lever Lock Pin 25 Hammer Spring 26 Lever 27 Lever Spring 28 Lever Screw 29 Lever Axle Pin 30 Breech Bolt 31 Cam 32 Cam Screw 33 Extractor Spring hammer. The increase in height can be done with welding and perhaps with a "button" of drill rod soldered into the stub. Either way, figure on cutting non-slip grooves in the addition.

Do you suppose a hand checkering file/cutter would be the tool to do that? Have a chat with Brownells on the possibility. They might suggest a set of their screw head refinishing files instead.

AG Century Arms PW87 (Specifications subject to change without notice) 45 Forend Screw Front 46 Forend Washer (2) 47 Forend Screw Rear 48 Left Forend 49 Hammer 50 Hammer Inner Washer Pin 51 Inner Washer Pin 52 Butt Stock 53 Butt Plate 54 Butt Plate Screws (2) 34 Extractor Detent 35 Left Extractor 36 Right Extractor 37 Firing Pin Retaining Pin 38 Firing Pin Spring 39 Firing Pin 40 Trigger 41 Left Cartridge Guide 42 Magazine Tube 43 Magazine Follower 44 Magazine Spring

PEOPLE & COMPANIES

Colt Gold Cup

Browning's 1911 has been around a long time and plenty of references are available, as well as misinformation and misinterpretation. This is especially true with the Colt Gold Cup.

BY ROBERT K. CAMPBELL MARCH 2013

ORIGINAL PP. 7-10

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1697-P07-F01. Know the rights holder? Please ask them to contact us.
AG-6D1D6FE961-A1697-P07-F01

Colt's Gold Cup is primarily a target pistol for American Conventional Pistol and National Match Course events under National Rifle Association and Civilian Marksmanship Program rules. There are differences between it and other 1911 pistols you'll encounter but you don't have to be a historical researcher or Colt firearms production expert to work with Gold Cups. Let's look at a few of the pieces of history and practical actions that need to be taken.

The National Matches held annually at Camp Perry since 1907 were the impetus for improved Colt pistols. Service pistol matches severely challenged the 1911. I have fired a number of original circa 1920s pistols with some in fine shape and others worn. The average 1911 of that era is good for five shots into five inches at 25 yards with Winchester USA 230 grain ball. Some will do a little better but others are worse. The pistols were usually sighted for a six o'clock hold at 25 yards.

With a trigger compression of six to eight pounds, the 1911 was not possessed of fine accuracy. The 1911A1 was a slight improvement. The National Match pistol changed

that. Military shooting team gunsmiths addressed the shortcomings of the 1911A1. A very important point is that expense was not an object. The gunsmiths took months to perfect the pistol if need be. An armorer might work for months in welding the barrel up and then filing it to a tight precision fit. The three point pedestal lockup was perfected.

National Match barrels and National Match barrel bushings were perfect (net). ed. Many 1911 innovations such as rubber grips and aluminum triggers were first developed by these gunsmiths. In simple terms, these National Match handguns usually featured a lighter trigger and specially fitted barrel and bushing. When Colt began producing their own National Match pistol, much the same program was followed. The original National Match featured high visibility fixed sights.

These were soon replaced with adjustable sights such as the Stevens and Ellison. Overall, these pistols were robust and often carried by experienced handgunners and lawmen. Gold Cup In 1957, a pistol was introduced that was largely responsible for the Gold Cup's undeserved reputation for

fragility. From the factory, the Gold Cup was designed to accommodate light target loads where all previous Colt pistols were set up for 230 grain ball.

The ballistic differences of a 185 grain bullet at 750 feet per second of a typical target load compared to 230 grains at 820 FPS are notable. Lighter weight recoil and hammer springs were used to allow function with less-stout target loads. Further, these pistols were sometimes modified by the end user by clipping these already-lightened springs.

The 1957-era Gold Cup also featured a lightened slide, changing the weight of the pistol from the 39 ounce standard for the Government Model and National Match to 37 ounces. This allowed the slide to recoil more freely with light loads. With the lighter springs and slide the pistol worked just fine with 185 grain target loads and even the seldom-seen 215 grain lead SWC target load once loaded by Winchester, as designed. Heavier loads were a different matter.

I HAVE ON HAND PERIODICALS OF THE DAY IN WHICH WRITERS IN THE

COLT GOLD CUP CONTINUED

ORIGINAL PAGE 8

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1697-P08-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1697-P08-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1697-P08-F02. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1697-P08-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1697-P08-F03. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1697-P08-F03

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1697-P08-F04. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1697-P08-F04

Be certain you know how to adjust the sights of the Gold Cup. popular press counsel their readers to change the recoil spring if they wish to shoot hardball in their Gold Cup. The fact is, this does nothing to help ready the piece for hardball as the recoil spring was the standard 16 pounds of the Government Model. Those who simply changed the recoil spring battered their Gold Cup to death, having left the lightweight hammer spring and slide in place.

Note, in those days there were no aftermarket sights for the 1911 readily available. Those wishing an improved pistol purchased the Gold Cup, even if they intended to shoot full power loads. As a result, many Gold Cups were subjected to a premature retire-

ment. Series 70 And 80 With the introduction of the Series 70, the Gold Cup was produced with a standard weight slide. Target shooters had complained of the loss of balance in the lighter pistol so the lightening slots in the slide were discontinued.

The new Gold Cup featured the characteristic flat top slide, Ellison sights, flat trigger and match grade fitting that we recognize as Gold Cup, Colt. The Series 80 is much the same except for the firing pin block. The first stainless steel Gold Cup pistols were introduced in the Series 80 line. While a robust pistol, the Series 80 retained the roll pin in the adjustable sights that had been criticized in the past. The Gold Cup is pinned in, which can lead to problems.

Be prepared to check the barrel for accuracy destroying lead deposits. Many felt that the roll pin was a fault that allowed the rear sight to wobble or even depart the pistol in firing. It was recommended that a solid roll pin be added to retain the sight. The Series 70 and Series 80 Gold Cups are widely distributed and I have worked with many. In my experience these pistols are capable of two inch 25 yard groups on demand with good quality match grade ammunition such as the Federal 185 grain Match load.

Occasionally, a Gold Cup without any type of modification will do two inches at 50 yards. A pistol that groups over two inches at 25 yards with Cor-Bon (shopcorbon.com) 230 grain Performance Match or a carefully devel-

COLT GOLD CUP CONTINUED

ORIGINAL PAGE 9

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1697-P09-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1697-P09-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1697-P09-F02. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1697-P09-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1697-P09-F03. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1697-P09-F03

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1697-P09-F04. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1697-P09-F04

This is good kit straight from Hartford. oped handload using one of the Oregon Trail (laser-cast.com) lead SWC bullets is out of whack. Necessary Modifications These pistols have been around long enough that sometimes simply returning them to the original format solves some problems. A 1911 with mismatched springs is seldom reliable. Returning the pistol to the original hammer spring and recoil spring formula is often the best course. At least then, with the pistol up to specification, you can begin anew.

It is very difficult to judge spring weight by eyeballing it. With 1957 to 1970 era Gold Cups, these are most often battered due to the lighter slides and misinformation. They

are best used as target pistols only and not set up for hardball. Just the same, I have included the specifications for heavy springs for heavy loads. The original specifications recommend a hammer spring of 15 pounds and recoil spring of 16.

For use with 230 grain ball, the recommended hammer spring is 24 pounds with a 18.5 pounds recoil spring. Since the original spring was 16 pounds and the slide is lighter than the Government Model, heavier Wolff spring (gunsprings.com) is recommended with hardball loads. This will cure most problems if the pistol is not already battered. With Series 70 and 80 pistols, from the factory the hammer spring is 15 pounds and recoil spring is 16 pounds.

For use with hardball, ren.c. trigger, sear and disconnect with good results. If the Gold Cup isn't as accurate as the factory test target, something is wrong in the equation. place the hammer spring with a 23 pound unit. Another needed modification is replacing the roll pin that attaches the sights to the slide with a solid pin. This is easily done by driving the old pin out and inserting a proper length roll pin.

However, the new roll pin must be a tight fit or it will also work its way out during the stress of recoil. While the pin is a problem the design is not ideal. Modern target grade 1911s feature dovetailed rear sights. I have used a kit from Wilson Combat in adjusting target pistols

for light loads. Some caution is demanded as the owner must understand exactly the work performed. A pistol that has been set up for a 185 grain/750 FPS target load may function fine but if fired with the +P loads—185 grains at 1150 FPS or so—the pistol would probably be damaged quickly. The Wilson Combat spring caddy offers springs of ten to eighteen pounds in strength.

These springs offer the trained shooter or gunsmith tuning a pistol a good option and the opportunity to create a functioning pistol without clipping springs. I have clipped springs myself with the cut and dry method and while it works just fine with sufficient attention to detail, the process is not easily repeatable and spring weight not easily read. Sear And Trigger Gold Cups have a special spring loaded attachment on the sear that absorbs pressure from the trigger. Complete your American Gunsmith collection.

OR READ UP ON A SPECIAL SUBJECT! A LIMITED NUMBER OF THE FOLLOWING

ORIGINAL SOURCE PAGE

10

TOOLS & FIXTURES

Save Your Receipts!

A good system for keeping financial records will help you set fair prices for your work, stay out of trouble with the tax man and enable you to delegate bookkeeping when you become successful.

BY JOSEPH REICHERT MARCH 2013

ORIGINAL PP. 11-13

I have operated a specialty shop for several years, manufacturing one-off tooling for gunsmiths, shooters, reloaders and craftspeople. My operation has not yet outgrown a single room shop, a small office and a storage shed. I think myself justified in calling my enterprise a “small business” but it has started to turn a profit. Just as important to me is the fact that I enjoy the work, which has allowed me to meet many talented people.

My business has not required a heavy investment of money but it has definitely required a serious investment of time. Experience has taught me that we will pay with one or the other. If we want to conserve money, we will probably find ourselves hard at work on Saturday night, salvaging a worn machine, scouting for materials or otherwise making shift with what we have.

In my case, making shift has included acting as my own business planner and bookkeeper, doing my best to measure the profitability of my work and pay my taxes in a timely way. This article describes a system I have set up to keep my records, using a combination of freeware computer programs and forms I created to track my transactions.

While I do not claim to have a one-size-fits-all system that you can simply pick up and run with, I am confident that many readers will find my way of doing things helpful and that many features will be adaptable to your operations. I have no intention of criticizing the skilled accountants and bookkeepers who can handle our

money for us, nor do I find any fault with the accounting and bookkeeping programs we can purchase from software vendors.

I consult professionals on issues I cannot resolve myself but I do it with the attitude that I am paying tuition. I try to learn as much as I can about their approach to the questions I bring to them. I am aware of the assistance I can purchase but I have been obliged to rely heavily on things I can get for free. Contrary to the adage that we get what we pay for, I find that there are free and low-cost things worth having.

Among them I have identified some as especially valuable, such as free software, business forms I create myself, publications given away by the IRS, no cost and low cost courses sponsored by SCORE (Service Corps Of Retired Executives) and document tracking systems I have copied from prior employers. I strongly recommend that you visit and bookmark the websites of the IRS (irs.gov) and SCORE (score.org).

The IRS provides many sources of information for those who wish to educate themselves in the matter of taxes and SCORE offers a wide range of advice from retired executives, much of it available in online courses. Countless conversations with customers has taught me that skilled gunsmiths practice their profession for the love of their craft. For this reason, they sometimes fail to see that excellence in gunsmithing is not the same thing as excellence in the business of gunsmithing.

They may be distinctly disinterested in tracking expenses, learning how to depreciate expensive machinery or determining

the true cost to themselves of the products and services they provide. The end result of this neglect can sometimes be a financial disappointment. To avoid this, we need to have systems in place, so keeping good records is, as much as possible, reduced to a routine.

Before opening my own shop, I discussed my plans with all the successful entrepreneurs I knew and came away with three basic requirements for any system that all agreed. First, identifying all expenses I meet in the process of delivering my goods and services, second, taking all legitimate tax deductions and, thirdly, recording transactions as part of a routine, clear enough that, if the need arises, I can delegate recording activities to another.

Meeting the first objective allows me to set fair prices for my work, meeting the second lowers my tax bill and the third will allow me to transition my tasks to a professional bookkeeper or accountant, when my time becomes so valuable that I can no longer afford to supervise this part of my business. This last objective shows how optimistic I am. If we want to have a business we must first determine the true cost of the goods and services we sell.

I find I must take a careful look at everything I do, to reveal expenses that might otherwise escape my attention. There are expenses we incur without knowing it, because it is not always obvious to us that we consume things such as the buildings in which we work and the machine tools we use to cut metal. The real cost of these things is only revealed to us when the shop roof must be

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1698-P12-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1698-P12-F01

Here is a simplified example of how this might be done, by taking the primary categories from federal Schedule C and creating corresponding subcategories appropriate to your own shop. repaired or the lathe needs anew change gear. If we have anticipated these expenses and made some provision for them in the price of our products, we will be in a much safer long term position. Ferret out all the hidden costs of your shop, to make sure that your prices are sustainable.

The next phase of this project is setting up a system for recording income and expenses. Because I am a sole proprietor, and have not set up a corporation, I started by reviewing the federal Schedule C, which lists the classes of deductions a sole proprietor is allowed to take. I then set about listing, under each scheduled category, the corresponding costs I knew I would incur when manufacturing specialty tools for others.

I was helped out in this by the fact that I completed a machinist apprenticeship program and had a good handle on the sorts of expenses that arise when running a shop. For example, I knew that I would have to find a suitable category for the tool handles and wood I purchase when a customer orders a special screwdriver (Cost Of Goods Sold) and the pay I give to workers who occasionally come in to help me move machinery, clean the shop or do take-home deburring work on the small parts I machine (Contract Labor).

Several of the categories are vague and it can be hard to determine what expenses are included in them. For example, the "Office Expenses" category (line 18) is intended to cover office supplies and postage. To discover this fact, I had to go to the instructions for Schedule C, and to IRS Publication 334, Tax Guide For Small Business.

After spending considerable time in this exercise, I had created categories for every type of expense I anticipated I would incur in the course of my work and listed them in groups, under the principal heading of one of the categories appearing on Schedule C. By adding up the numbers in each category at the end of the year, and adding up the money I took in as payment for my work, I could calculate the taxable income from my little business and enter that on my tax return, Form 1040.

Of course, I did not want to sit at a desk on April 14, entering in a calculator the amount appearing on every receipt for all purchases made throughout the preceding year. This is where open source software comes into the picture, in the form of a program called Gnu Cash. I consider Gnu Cash to be one of the greatest bargains I have ever found, because it is free and it works.

It is a versatile small business and financial accounting program available for GNU/Linux, BSD, Solaris, Mac OS X and Microsoft Windows operating systems. Download the latest version, visit the Gnu Cash (gnucash.org) website. Gnu Cash is a

useful program that provides rapid, practical education in handling business finances. You will find the user's manual (which downloads with the program) to be a useful and concise tutorial in the basic principles of small business accounting.

If you need extra help in understanding the program, or you believe you have uncovered a bug in it, the site also gives instructions on contacting members of the Gnu Cash development team. I have not contacted them frequently but the team members have been responsive to my questions. Once you have the program installed on your computer, you have come to the heart of the matter.

Gnu Cash, like similar commercial programs, permits the user to set up accounts to track income and expenses and to create a report that will take all income received during a given period, subtract all expenses incurred during that time and report profit or loss.

As I use the program, I have an account called "Income", and as I am paid for my work, I record the money received under that heading, while simultaneously posting it to the places I will ultimately deposit it, either in my business checking account (an account called "Checking") or in a cash account ("Petty Cash".) As I write checks and spend cash for business purposes, I record each payment under one of my expense headings.

For example, the payment of my water bill would be recorded in the expense category of "Utilities"

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1698-P13-F01. Know the rights holder? Please ask them to contact us.
AG-6D1D6FE961-A1698-P13-F01

(Schedule C, line 25). You can use the Gnu Cash program to move the payments around and to edit and add categories if you find it necessary. The essential thing is recording all business transactions. The end result is a complete record of all my income and all my expenses, a record I can analyze for any time period I choose.

In effect, I record the profitability of my shop and do my taxes as I go along, rather than saving these tasks for tax season, when I still see a few of my customers struggling through shoe boxes filled with receipts. After I adopted this system, I came up with an addition that has helped me greatly, a standardized "traveler" document, which accompanies each receipt and stays with the hard copy after it has been filed away.

The receipt traveler is a small form document generated by my word processing program listing everything I must do with each receipt in order to keep my system working. This is an idea I borrowed from the US Department Of Energy, where I worked as a prototype machinist and inspector.

Believe it or not, the managers of the laboratory where I worked actually helped us with these bits of extra government paperwork because we had a ready checklist of the numerous things we were required to do with documents such as receipts, quality control reports, and material certificates.

My receipt traveler provides a blank space for the date payment was made, how it was made (by cash, check or business credit card), the goods and services purchased, the identity of the payee and the business purpose served by that purchase. After using this form for awhile, I added a space for recording the business use of my personal automobile. This is a deductible expense that I confidently predict all of us will incur, whether we are gunsmiths, gun dealers or, like myself, tool makers for the gun trade.

I noticed that almost all of my mileage accrued because I used my car to go out and buy something needed for my shop, so it was logical to tie my mileage to the purchase receipts generated during those trips. The IRS requires a written record of deductions for mileage and I cannot think of an easier way to keep track of it. Moreover, if my deductions should be questioned, a receipt from a local supplier is powerful proof that I really did visit his store.

The IRS changes the mileage allowance from time to time, so it is a good idea to consult their publications to verify what it is at any given time. Other small business owners have adapted my system in various ways. A friend who owns a fastener company has made my traveler into a chart and reviews it when entering business expenses into his computerized books. This insures that he records all necessary information about a given expense, but without a document that follows the receipts.

Another, a stock maker who orders blanks online, modified the traveler by adding a space for tracking and delivery information. He posts any pending order on a cork board near his desk until the shipment arrives and has at his fingertips all the information he needs if he needs complain about a delayed or noncompliant shipment. The foregoing is a brief summary of the system I have in place, deleting many of the details specific to my operation.

I believe that anyone starting out on a shoestring is bound to find some of its features useful. If you cannot afford to have the services of an accountant to set up a system for you, it is not important that you adopt the details of my method, however, it is very important that you set up some logical, orderly system. Even if your plan contains a few flaws, those errors are much more easily corrected by a professional if they are organized, rather than coming to him or her concealed in a jumble of paper.

If you area gunsmith, gun dealer, or apart-time craftsman catering to gunsmiths, you are also a business proprietor. Being the proprietor of a business, however small, is an occupation separate from gunsmithing work. It behooves all of us to learn as much as we can about every aspect of our trade, including the subjects of accounting, taxes and the setting of prices for our work. Diligent attention to these matters will greatly assist in making your business sustainable, profitable and enjoyable. AG

MACHINING

The Relationship Of Barrel Extension Diameter To Accuracy In The AR-15, Part 1

Slop in fitting the barrel extension to the upper receiver can rob your rifle of its potential accuracy.

BY JOE CARLOS MARCH 2013

ORIGINAL PP. 14-17

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1699-P14-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1699-P14-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1699-P14-F02. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1699-P14-F02

AR-platform guns don't assemble the same way as most other rifles. Take bolt guns for example. In M24 sniper rifles the front of the receiver has a female thread machined into it and the back of the barrel has a corresponding male thread and the barrel physically screws into place during assembly of the rifle. Contrast this to the M16. The barrel extension is not integral with the barrel. It is not apart of the barrel. It is a cylindrical piece of metal about 1 1/8" long machined separately.

At one end of the barrel extension there is a raised collar, often called a flange, all around its circumference which abuts against the front of the upper receiver when everything is assembled and in place. The barrel is threaded at the rear (much like a bolt gun barrel) and it physically screws into a female thread in the barrel extension. That barrel extension simply slips into the front of the receiver upon assembly—it is not directly threaded into the receiver in any way.

Since it is a slip fit there is a lot of play. Anyone who has ever rebarreled or watched someone assemble an AR-15 upper will note that up until screwing the barrel

nut in place the barrel will wiggle around, giving a lot of potential accuracy robbing slop. The next step in the assembly process is to screw the barrel nut on to the front of the receiver.

This captures the barrel extension by pressing that they screw into a barrel extension that slips into the receiver. raised collar against the front of the receiver. Note that the raised shoulder (flange) on the barrel extension just abuts against the corresponding face of the front of the receiver. Screwing the barrel nut in place removes most of the visible play that I mentioned before.

The role of the barrel nut is more effective in removing forward to rear movement of the barrel than up and down or sidewise play inside the receiver, however. If either the flange on the barrel extension or the corresponding front surface of the receiver fail to be perfectly square where they abut, accuracy problems will likely be exacerbated. Note, trying to correct the up and down or side to side

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1699-P15-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1699-P15-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1699-P15-F02. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1699-P15-F02

movement of the barrel extension inside the receiver by increasing torque on the barrel nut enough to line up the next timing notch is not the correct fix. Doing so may damage the receiver and it will likely affect the harmonics of the barrel. Do not try this gorilla approach. Instead, follow the procedures in this article. We will address correct barrel nut torque as it relates to accuracy in a future article.

Securing the barrel as I have just discussed provides enough accuracy for most military battlefield applications. It is also fairly simplistic and doesn't require a lot of sophisticated tools or gunsmithing skills. Military armorers can rebarrel a rifle much easier (and probably with less training) than the previous M-14 issue rifles. The Epiphany Forty years ago when I began shooting competitively I had no desire to become an armorer nor did I think I ever would.

Gradually I began working on some of my own guns simply because I wasn't able to find someone else that I trusted. Soon, other members of the Army Reserve Shooting Team began asking me to work for them. Eventually I became so busy working on guns that I no longer had the time to train and I dropped out of competition. I did carry the observations and lessons learned as a

shooter to my new job, however, and I believe it has helped make me a better armorer.

One such observation was made over 20 years ago in Australia in the late 80's or early 90's when the All Army Reserve Shooting Team was at Belmont Range competing against foreign military teams in an international combat match hosted by the Australian Army Rifle Association. I remember coming back to the tent late one afternoon and everybody was cleaning their M16's. One guy must have left his bore guide stateside because the back of his barrel extension was all slopped up with excess solvent and oil.

He discovered that if he firmly held the upper receiver with one hand and put pressures on his barrel with the other hand he could see air bubbles and movement in the excess fluid that corresponded to the flexing pressures that he applied to the front of his barrel. Like little kids, everyone else had to try it too and a fair number saw the same tell tales that their barrel extensions also exhibited a lot of slop.

We all came to the conclusion that any movement at the back of the barrel would cause erratic and exaggerated vibrations

and a less than stellar return to consistent registration points at the muzzle between shots. This, in turn, would result in fat groups, fliers, and wandering zeroes. What to do about the problem remained uncertain, however. Fast Forward "Look on my works, ye Mighty, and despair." —Percy Bysshe Shelley, Ozymandias. Now, fast forward to the early 2000's.

I was just taking over as the armorer for the All Army Reserve Service Rifle Team. The team owned 135 M16A2 NMC uppers. 50 uppers had recently been purchased from a very highly respected civilian custom shop and the remaining 85 had been built by the most prestigious full-time military armorers. I needed a base line so I began machine rest testing the entire population. Given the lineage of these guns I expected to see some impressive groups. I was very disappointed. Average 10 shot group sizes exceeded one MOA.

Out of the whole population of 135 uppers only 39 would shoot minute of angle with any lot of ammo. For the most part, shot out barrels were not the problem. Remember, 50 of the barrels were brand new. Throat gauge readings and log book entries revealed that very few of the remaining 85 bar-

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1699-P16-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1699-P16-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1699-P16-F02. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1699-P16-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1699-P16-F03. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1699-P16-F03

rels were worn out. They were just all performing less than optimally. So, how to fix the problem? I was aware that Derrick Martin over on the National Guard side of the house was applying red Loctite to the barrel extensions of his guns during assembly. Derrick is the owner of the custom gun shop Accuracy Speaks (accuracyspeaks.com) and wrote the very informative book *The Complete Guide To AR-15 Accuracy*. He described using red Loctite in his book.

Derrick is a well respected gunsmith and when I heard (some time in the 1990's by word of mouth prior to the publication of his book) that he was using Loctite I began with the red also. Since red is mostly a thread locking compound I soon migrated to green #620. According to Loctite, the #620 is designed to withstand high temperatures, like one would expect near the chamber of guns shooting 10 shot strings of rapid fire. The 620 was designed for slip fits where gaps are large.

It is thicker than the red Loctite and seems to fill gaps between the barrel extension and the corresponding inside surface of the receiver quite well. I had been using the green Loctite on AR-15's that I had been building for civilians and felt that the extra few minutes it took to apply it was time well spent. I had inherited no spare parts when I took over the armorer job for the Reserves but shot out barrels were not the problem anyway.

I decided to rebuild some of the worst shooting uppers using the green Loctite. After the rebuilds I retested them on the machine rest using the same lots of ammo as the first tests and quickly saw improvement. I eventually rebuilt all 135 of the uppers using green Loctite. Compared to the original 10 shot groups the average improvement in accuracy was a very substantial 18.6%. Not only were groups tightened but the incidence and severity of fliers was lessened.

Shooters could see that their rifles were shooting noticeably better and customer satisfaction was very high. Over the next decade I continued to make improvements and when I left the team a little over a year ago 001" shim stock. to pursue my civilian market I had succeeded in cutting group sizes about in half from what I had inherited. All 135 of the team's guns would shoot sub minute 10 shot groups with some type of ammo. How I accomplished this will be the subject of future articles.

While I had the 135 guns apart performing the rebuilds I measured and recorded the diameters of their barrel extensions. My records show a pretty wide range spanning from 0.9965" on the skinny end up to 1.0005" on the fat end. The barrel extension is not considered a precision part. It doesn't move (or, it is

THE RELATIONSHIP OF BARREL EXTENSION DIAMETER TO ACCURACY IN THE AR-15, PART 1 CONTINUED

ORIGINAL PAGE 17

not supposed to) and, up until recently, most manufacturers apparently took a rather cavalier attitude regarding quality control. What can you expect from a \$20 part? When I compared the barrel extension diameters of rifles that tested below average in accuracy to those that shot better than average I found that the bad barrels had skinnier extensions (causing more slop at the back of the barrel). So the conclusion is that undersized extensions contribute to fat groups, fliers, and degraded performance in general.

Having said that the following caveat begs to be written. The fit of the back of the barrel is important but it is trumped by barrel quality. A poor quality barrel is not going to magically transform into a tack driver just because the gunsmith spent a little extra effort in the shop ensuring that the back of the barrel is properly stabilized in the receiver. On the other hand, even the best barrel will never deliver its potential if it is thrown into the receiver with no effort made to ensure a tight fit.

Also, remember that receiver dimensions vary as well. There are noticeable differences in receivers even when purchased for the same source.

This includes the space where the barrel extension lives so variations in dimensions of stock barrel extensions may conspire with variations in receiver dimensions to result in some awful fits if you ignore the tips in this article and continue to build rifles "the regular way." Improvements During the decade that I relied solely on green Loctite I always wondered if there was away to improve even more on the fit of the barrel extension to the receiver.

I thought about approaching machine shops to see if they would make up some oversized barrel extensions but figured that the cost would be prohibitive. I also wondered if using shim stock would result in a better fit and went that route. I use very thin 0.001" stainless shim stock cut

about $\frac{3}{4}$ " wide. Standard household scissors can be used for this as the thin stock cuts like paper.

The barrel extension has about one inch of bearing length, not including the flange, and cutting the shim stock a little on the narrow side gives me leeway to keep it centered and not extending out from either the front or back. The average length of my shims is about $2\frac{1}{4}$ ". I start with that length and attempt a trial fitting, first without Loctite, to see if the barrel will go into the receiver with the shim stock in place. If I still have a lot of slop I cut another replacement piece of stock a little longer.

If the fit is too tight to go in place I gradually trim the length until everything goes tightly in place. My average length shims partially encircle about $\frac{2}{3}$ of the bottom and sides of the barrel extension. I think that is a better approach than to use a shorter, thicker shim that might have the tendency to create a high spot for the barrel to pivot and vibrate around. I avoid getting the thin shim stock up around the extension pin or the corresponding cut out in the receiver as it is easily torn during assembly.

After the trial fit I apply green #620 Loctite all around the barrel extension and the corresponding inside surface in the receiver. Insure that all surfaces have been immaculately degreased first. I put the shim stock in place (around the bottom $\frac{2}{3}$ of the extension) and then apply more green Loctite to the outside surface of the shim, carefully working the barrel with shim into place in the receiver. Any excess is cleaned off before torturing the barrel nut in place.

Then I go inside the receiver and wipe off excess Loctite from the back of the extension so everything is nice and clean. A couple of caveats are in order. First, I recommend avoiding the faster drying slip fit #638 Loctite for this application. The #620 sets up slower. Your first few attempts may

well end up taking 20 minutes to get the hang of things and a faster drying adhesive would likely be detrimental.

Second, absolutely avoid letting shim stock curl up between the back of the barrel extension flange and the front of the receiver forming a high spot for the barrel to vibrate around. I find it helps me to initially position the shim stock to just barely hang out over the back of the barrel extension. Try about $\frac{1}{8}$ " or $\frac{1}{16}$ " of overhang to start with and fine tune, if necessary, to match your exact assembly procedures.

That way when everything is pushed into place as the shim slips back toward the flange a little there still remains a healthy gap between the two upon final assembly. If you do find the shim slipping too much while you are working the barrel into the receiver just apply a little finger pressure and it will stay in place. Too much overhang can cause some shim to extend out the back of the extension inside the receiver which could cause malfunctions with the bolt carrier.

If this occurs just use the point of a knife to trace (scar) the shim along the back of the extension and then tear the excess shim stock off using tweezers. This might sound intimidating. Expect your first couple of attempts to take upwards of twenty minutes. With practice, however, you should easily be getting good results in just about five minutes. If it is just too difficult for you, simply ask most any kindergarten or first grade art student to assist. It will be "child's play" for them!

Finally, Loctite says the #620 will adequately set up in about 24 hours. In some cases I have found that to be somewhat on the optimistic side and let everything undisturbed for several days before firing the gun. Next time we will go into more detail on expected accuracy gains using the combination of Loctite and shim stock. Then we will talk about newly introduced custom barrel extensions from Bat Machine that may save you time and result in a better rifle. AG

FROM THE ARCHIVE

Tracking Point

Guided smart weapons for riflemen.

BY JOHN M. BUOL JR. MARCH 2013

ORIGINAL PP. 18-22

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1700-P18-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1700-P18-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1700-P18-F02. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1700-P18-F02

Project White Feather was a US Special Operations Command (SOCOM)-sponsored effort to improve sniper weapon fire control technology to help extend effective range and increase first round hit probability. As envisioned, the fire control improvements were to provide the shooter a real-time, ballistically corrected aim point with input from a laser crosswind detector, laser range finder, inertial sensors that measure weapon motion, as well as other sensors.

The Weapons & Materials Research Directorate of the Army Research Laboratory published a white paper entitled *Sniper Weapon Fire Control Error Budget Analysis* (ARL-TR-2065) about these tests. One interesting revelation was weapon pointing (aiming) error analysis, or the ability of a shooter to hold his or her aim on target.

According to their tests, the standard deviation of aiming error for the best, formally-trained operational snipers was three times worse than tested High Power and Long Range competition shooters sufficiently skilled to compete successfully in national level match competition at Camp Perry and

the like. In fact, the worst competition shooters tested were as good or better than the best snipers in basic holding and shooting fundamentals.

This is simply raw marksmanship fundamentals, and doesn't take into account shot error due to range, wind or environment estimations, all the things that can spoil an otherwise well pointed shot. Testing also revealed that on 1000 yard humanoid silhouette targets operational snipers have first shot success probability of only 3%. These SOCOM-sponsored tests were not intended to denigrate snipers, only to point out that hitting at long range is difficult and fraught with many variables.

Better training reduces error, as the competitive shooters prove, but this requires time and effort. A sniper or other shooter not personally motivated to take up organized competition on a regular, on-going basis will remain the biggest source of error in any shot. Precision Guided Firearms "Smart bombs" have been known to even casual, non-military observers for several decades now. Precision 338 Lapua Magnum and .300 Winchester Magnum (pictured) Surgeon Rifles.

Each unit is packaged in a custom Pelican case and includes 200 rounds of ammo and needed accessories. Guided Munitions, as they're more correctly called, typically work by allowing for corrections of the projectile after launch. With so many variables influencing a projectile, the means to make adjustments during flight greatly increases hit probability. Guidance can be accomplished by radio, infrared homing (heat seeking), laser, satellite (GPS) or other means.

A working solution for small arms is to better guide the rifle, not the projectile. Ballistic problems can be solved instantly with a computer smaller than the processor in your cell phone and sensors can automate the input of variables, feeding updated information real time.

Distance to target, weapon attitude (slope angle and cant), ambient temperature and barometric pressure can all be detected and compensated for within an algorithm, given that the projectile's muzzle velocity, ballistic coefficient and spin drift are known. While there isn't yet a working solution, laser detection of wind speed

TRACKING POINT CONTINUED

ORIGINAL PAGE 19

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1700-P19-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1700-P19-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1700-P19-F02. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1700-P19-F02

The trigger arms the system while the target is continuously tracked and a solenoid releases the sear when the rifle is pointed properly. Other applications can run training simulators, and direction along the gun-target line has shown some potential. The last remaining problem is the person holding and actuating the trigger. Despite a perfectly predicted ballistic solution, any shooting error will still spoil the shot.

Even if the sights indicate exact point of impact, the shooter must hold them on target and release the shot without disruption. It takes years for a dedicated competitor to achieve this, one reason Camp Perry competitors are 300% better at holding and eliminating aiming error than operation snipers according to SOCOM's tests. With most people not as good as trained snipers and not motivated enough to take up competitive shooting, the problem remains daunting. A PGF also has to remove this problem.

Enter Tracking Point While hunting in Tanzania, John Mc Hale came across a Thomson's gazelle, a wary species about the size of a small coyote. After a stalk, he was able to get about 300 yards from a nice male. Even with tripod-type shooting sticks and a good rifle with a six power scope, the shot proved too difficult and he missed several attempts. Disappointed, he realized he couldn't stay steady enough while pressing the trigger perfectly.

Sure, more effective training and practice would solve this, but Mc Hale, having along career in network computing technology including work on the TOW missile and M1 Abrams tank, began to think how he could use existing technology to tackle the problem. He started research and Tracking Point was born.

Tracking Point is an Austin, Texas-based applied technology company that recently created the first Precision Guided Firearm, along range shooting system that puts computer controlled "lock and launch" technology akin to the Heads Up Display of a jet fighter inside a rifle. Mc Hale assembled a multi-disciplinary team to bring this off.

Jason Schauble brings in firearms, ammunition and operational expertise having previously run Remington Defense, served as a senior civilian operations officer for Marine Special Operations Command and having a decorated military career (Silver Star, Bronze Star, Purple Heart recipient) as a combat leader with Marine Force Recon.

Chief Technology Officer John Lupher, with engineering degrees from Texas A&M and Stanford University and twenty years experience developing industrial, consumer and military products, directs research and development. The company currently employs 44 people, with 30 engineers having backgrounds in optics, software, electronics, and machining.

Tracking Point calls their PGF the Xact System, which incorporates a custom rifle, precision conventional ammunition, net-

worked tracking scope with heads up display, and a guided trigger into a closed loop system.

The Xact System not only calculates and updates a ballistic solution for each shot 54 times a second, the system controls the trigger and only fires when the sights are properly aligned on the target predesignated ("tagged") by the shooter, thus eliminating errors in aim, trigger control, environmental inputs and range miscalculation regardless of shooter skill level or expertise.

At the heart of Tracking Point's system is a ballistic computer modeled with the specific ammunition provided with the Xact System, arriving from the factory zeroed and ready to use. A Barrel Reference System detects the optic's relationship to the bore and adjusts for any alignment shift between the barrel and the scope. Because microscopic changes between the barrel/optic relationship can be measured by the BRS, the zero is automatically readjusted as needed.

The system keeps count of shots fired and adjusts for how muzzle velocity will be affected due to barrel wear. To use, the unit is turned on, the view zoomed and focused. Depending on model, Xact Systems have a native optical zoom of 30x to 35x. The sequence to engage is tag, track, shoot, called TTX (Tag, Track, Xact) by the company. When a target is located, the shooter "tags" it by covering it with

TRACKING POINT CONTINUED

ORIGINAL PAGE 20

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1700-P20-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1700-P20-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1700-P20-F02. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1700-P20-F02

A blue aiming reticle indicates the system is not armed.) When the aiming reticle intersects the tag, the system releases the sear and fires the shot. the reticle and holding down the tag button next to the trigger guard. The tag, indicating the point of impact, is shown by a red dot. This tag can be removed by pressing the button again. Once the tag is on the right place, the trigger is held down, arming the system.

At any point, the shooter manually inputs the effective wind speed, the only environmental factor not compensated for. The ballistic computer adjusts for range, temperature, barometric pressure, spin drift, cant, inclination and wind input. An aiming reticle appears based on the ballistic solution needed to align the bore and obtain a hit. While holding the trigger down, the shooter tracks the aiming reticle onto the tag dot painting the target.

Movement of the target and rifle, as well as distance and environmental factors are continuously monitored and the ballistic solution is updated 54 times per second. When the aiming reticle intersects the tag dot on target, and if the trigger is still being held down, the system actuates the sear and fires the shot. Tracking Point refers to shot delivery part as "Xact" because it happens when the system detects proper alignment.

Xact Systems are networked and capable of streaming video from and into the optic from an external device. The Shot View app streams video from the optic's heads up display to a smartphone or tablet, allowing guides to mentor clients and shooters to share a first person view of a shot, in real time or recorded to video. A shot sequence from tag until ten seconds after the shot is taken can be recorded as video or still pictures, saved and shared. Tracking Point has three Xact- System PGFs available.

All are built with custom 0.5 MOA Surgeon rifles, Krieger cut rifled barrels and include 200 rounds of Barnes Bullets Xact- Shot ammo and an Apple i Pad Mini with software loaded fit in a custom Pelican case with cleaning rod and accessories. The XS1 is a .338 Lapua Magnum with 27" barrel, AAC muzzle brake, 6- 35X zoom firing 300 grain bullets and rated up to a minimum 1,200 yards.

The XS2 is a .300 Winchester Magnum with 22" barrel, AAC muzzle brake, 6-30X zoom firing 220 grain bullets and rated up to precision up to 1,000 yards minimum. The XS3, also a 300 Win Magnum, is a Mc Millan A5 with adjustable cheek piece and 22" barrel, 6-30X zoom firing 190 grain Barnes LRX and rated to 750 yards. Prices are \$19,995.00, \$17,500.00 and \$14,995.00 for XS1, XS2 and XS3, respectively. In Practice A rifle that zeroes, adjusts sights, and fires itself? What sorcery this be?

No sorcery here, just a very creative application and careful integration of many existing technologies. Software computing ballistics has been with us for years and available on palm sized devices for over a decade. Cell phones can crunch these numbers. The problem is accounting for all the possible variables. Even the most basic ballistics program requires input regarding sight height, muzzle velocity, ballistic coefficient and the like. Reasonable guesses or slight variation gets you close, but not exact.

There are also variations within the ammunition, shot-to-shot variations in muzzle velocity and within the rifle itself. Does your pet load shoot the exact same velocity in your rifle as it did when you tested it 200 rounds ago? Jason Schauble calls this the problem of nickels and dimes, where small errors start to add up. Tracking Point reduces much of this by making their Xact System PGFs closed systems and sold complete, with rifle, sight, software, tracking system and ammunition as an integrated package.

Surgeon Rifles, with a guaranteed 0.5 MOA accuracy standard or better thanks to its modern manufacturing processes, are the sole supplier of the rifle component in a Tracking Point PGF Barnes Bullets custom loads a specified cartridge for each system and does so with a standard deviation

TRACKING POINT CONTINUED

ORIGINAL PAGE 21

of ten feet per second or less. The optic and tracking system is permanently attached to its PGF and not available separately. These PGFs are based on Surgeon Rifles and will, obviously, safely and accurately shoot any appropriate cartridge it's chambered for. However, Tracking Point has spent considerable time and expense taking Doppler radar measurements of their chosen load and has modeled this in its ballistics software.

Furthermore, the specific effects of wear with this ammunition over the course of a barrel's life in this rifle is also modeled. Changing an internal variable changes the results, even if slightly, and this compounds in a stack up of error. With all these variables internal to the rifle-ammo combination controlled, external variables must be accounted for. Temperature and barometric sensors are not new and can feed this information in.

For the past several years, consumer electronics such as mobile phones and digital cameras have included tilt sensors and accelerometers, detecting roll, pitch and proper acceleration. This feeds cant, slope angle and rifle movement in as well. Laser range finders are also commonly available and home video game systems often include object movement detection, allowing players to play games without a controller. Much of the needed technology to make this work already existed in the consumer market space.

Tracking Point put the pieces together. So, does it work? What is a PGF useful for? Does it make marksmanship obsolete? After touring their facility, Jason Schauble took me to Best of the West Shooting Sports range in Liberty Hill, just outside Austin. After a quick demo, I plopped down behind an XS1 and had ago. We went through a series of dry shots to let me learn the controls. On the optic's top, starting from the front is a focus knob and zoom rocker, going from 6x to 35x.

Focused in, the image was very clear at any magnification. Knowing I had to estimate my own wind, I backed off the focus like a spotting scope in an attempt to read mirage. I could see some, but the image appeared slightly pixelated. The optic is actually presenting a digital image to the shooter's eye. I mentioned this to Jason and he noted the company is already working on a High Definition version.

This is similar to how military units, such as thermal sights, work and means that night vision capability can readily be included. The TTX sequence was easy to learn. Unlike a fired shot, if the tag point is wrong, just push the button again and redo it. When the tag is right, hold down the trigger and move the reticle to the tag point. The system doesn't fire unless the trigger is depressed and the reticle intersects the tag point. Using an iPad, Jason could see what I saw in the optic and teach me what to do.

Best of the West has steel targets at 250, 500, 750 and 1000 yards. Within minutes of learning the TTX sequence and playing with the system dry, I entered in wind correction and went live, resulting in a first round hit on all targets shot at each of the four distances. Mind you, this is with a rifle I had never fired and didn't zero or have data for. All the sight dope is built in. Feeling froggy, I had a tilt from standing with an XS3. Jason mentioned that Daniel Horner of the AMU had done this during his visit.

After getting my tag right, I armed the system and had a first round hit at a 250 yard target with a factory zeroed rifle and no sight data with a rifle I had never fired before from standing. The Verdict While my hands-on experience wasn't conclusive, I can say the system works as advertised. Tracking- Point has done extensive testing and the question isn't if their Xact System PGFs work. They do. This is a release of new technology and anew type of small arm equipment, the Precision Guided Firearm.

TRACKING POINT CONTINUED

ORIGINAL PAGE 22

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1700-P22-F01. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1700-P22-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1700-P22-F02. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1700-P22-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1700-P22-F03. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1700-P22-F03

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-6D1D6FE961-A1700-P22-F04. Know the rights holder? Please ask them to contact us.

AG-6D1D6FE961-A1700-P22-F04

The shooter is still part of the equation. Familiarization is possible within minutes, but it takes practice to efficiently and quickly tag and track. A sloppy, wobbling hold will make tagging difficult or impossible and the shooter will have to track back to an established tag. The barrel still has to point at the target to get a hit and the shooter has to put it there.

PGFs don't make the rifle more accurate or powerful, but make it easier for a shooter, especially one of less skill, to exploit that capability and to not let a shot go unless it really is on target with all the ballistic variables factored in. The potential for military use is huge. Rather than fight military bureaucracy, Tracking Point decided to release this to the open market. Military contracts are easier to arrange with COTS (Commercial Off The Shelf) equipment.

The US Army spends six figures to install Engagement Skills Trainer (EST) 2000 systems for training. Because Xact System PGFs are networkable and the optical image is a digital projection, an app running on a tablet or laptop can run training exercises and simulations, making it a self contained training system. There is no need to zero or record data, so live fire can focus on other training.

Consider the M110 (basically, a SR-25 with conventional scope and accessories) costs the Department of Defense over \$10,000 and a PGF doesn't look so expensive. This may appeal to professional hunters guiding clients. The sad truth is many people able and willing to spend five figures on a guided hunt won't bother learning to shoot well enough to have a successful hunt. Poor marksmanship skills area common complaint among PHs about their clients.

Having a rifle on hand means clients don't have to bring one and the guide is confident of the zero. Novice hunters being guided can tag game as often as needed until a good shot is set up. PHs can monitor selected shot placement and record the whole thing as a video for a client to enjoy later. Smart technology is now a reality in small arms. Precision Guided Firearms don't replace rifles, they are an entirely new equipment class.

As time goes on, the price point may drop enough that this will be practical in more mundane rifles. The goal of all shooting equipment is to make hitting the target easier. Just as rifled barrels and optical sights helped, technology continues to march. AG

READER FORUM

Reader Forum

BY AMERICAN GUNSMITH EDITORS MARCH 2013

ORIGINAL PP. 23-24

Marlin Barrel I plan on installing the barrel on a Marlin 70 and would like to know how to drill or file the barrel retaining pin without damaging the barrel or aluminum receiver. In examining the two Marlin M 70 schematics we have on file it appears the barrel retaining pin must be drifted out. However, we cannot determine from the drawings whether it drifts to the right or to the left. The pin may be tapered. If so, it must be drifted out toward its wider end and reinstalled smaller end first.

Measure both ends of the pin while it remains installed to determine drift direction. Seecamp I recently purchased two Seecamps as part of a collection. They seemed OK, but when trying to sell them I found problems seating the mag and working the slide. Seems you have to action the slide first to insert the mag. The slide drags on the follower to the point of stopping when worked on an empty mag and stops half open when actioned with the magazine out.

One Seecamp has a tight fitting mag that requires a screw driver to pry it loose for about 1/4 inch before removal. The mag in the other is also tight but can be pulled out by hand. I have not opened them up yet as I have never shot or seen a Seecamp before, although they are expensive and seem to have a good reputation from conversations at gun shows. Both are "restricted editions" made in small numbers. Any ideas, common problems, etc? Do you know anyone who specializes in their repair?

We're going to assume the pistols you're speaking of are double action conversions of the Colt M1911. At the time they were introduced (1973) they were the only commercially available DA .45 ACP semi autos in the world. L. W. Seecamp & Co., Inc. started life pistolsmithing, turned to

miniaturizing them in 1978 and patented a spring system presently used in practically all locked breech mini semi autos.

The company made its major directional change in the early 1980s when it turned from gunsmithing to gun manufacture. Their products are all DAO, small, not inexpensive, light, of traditional blow-back design, well made, ideal for CCW and available in .25 ACP, .32 ACP or .380. Robert Johns Seecamp no longer makes the DA M1911. One rumor has it that Colt acquired the patents and allowed them to lapse. However, Seecamp remains in business at Milford, CT 06460.

Technical inquiries have a dedicated phone: Since we can only surmise as to what the trouble might be with your ill-fitting magazines, other than they were not originally produced for the pistol, we suggest you seek a more definitive answer from the horse's mouth, so to speak. Henry Ejection Problem I'm having problems with ejection on anew Henry .22 lever action rifle. It will eject .22 shorts only and not longs or long rifle cartridges. I need a breakdown diagram for this rifle.

We don't feel a diagram will help but a schematic ought to be included in your owner's manual. There may be something amiss with your ejector but always remember .22 caliber ammo rim thickness often differs between brands. This frequently causes problems with extraction since the extractor cannot be "tuned" to function properly with all possible rim variations. Naturally, if the round fails to extract it probably won't come into contact with the ejector and be kicked out.

One possible resolution is to use the same brand of .22 LR ammunition as the .22 Short. Joe For the moment, we'll assume you are doing so and are still having problems. If your Henry has other than a built-in ejector, say, one that is integrated within

the receiver, you may be able to remove and replace it. Frankly, this AG Staff member's aging mind has forgotten the exact ejector configuration in a present day Henry.

Related to and complicating that last truth is the fact that Henry Repeating Arms has changed its manufacturing locale and its phone/FAX number. Current contact information, however, should be included in your owner's manual. If an ejector is not available due to factory restrictions we recommend the rifle be returned to Henry for corrective service under the warranty.

One final note, be advised that excessive use of .22 Short ammunition in a .22 LR chamber can erode the chamber over time causing Long Rifle extraction problems since the LR brass expands on firing to fill in the eroded area. J. Stevens No. 70 I have a J. Stevens No. 70 that came into my shop. There are several parts missing, like the firing pin, mainspring and the piece that connects the slide bar to the breach bolt. I am looking for a schematic and the parts so I can make sure there isn't anything else missing.

Any reassembly help you can give me would be greatly appreciated. Gary Smith June Jones Congratulations! Your customer has handed you a "Miserable Loader," so renamed from Visible Loader by gunsmiths who had the misfortune of working on it.

It was tagged "Visible" by Stevens, later taken over by Savage, because the last round exiting the magazine was visible to the shooter, a feature not present in other pump .22 rifles of the day, reportedly patented on April 30, 1907, and should NEVER be fed modern high velocity .22 ammunition. Outside of that, there is no schematic of the rifle but a parts drawing does appear in Jack First's Catalog,

READER FORUM CONTINUED

ORIGINAL PAGE 24

Volume II and parts are available from Bob's Gun Shop in Arkansas. On the brighter side, type in "Stevens Visible Loader Rifle" in your browser. When the list shows up scroll down to "Blueprints and Plans—Stevens Visible Loader" which purportedly includes assembly instructions. In addition, we covered the Visible Loader June 2011 and there's reference to an article than appeared in *American Rifleman* in 1986 written by Pete Dickey.

You'll be able to access some of it on your computer, but calling the Rifleman at NRA might get you a copy of the whole article. Winchester 1885 I have a Winchester (Miroku replica) Model 1885 in .22LR, serial number 000EFH08XX. It has a firing pin problem of some kind. It usually misfires and the firing pin doesn't move freely. Where could I get take-down instructions and/or a schematic diagram? Stan Shaw, Stan's Sports From the information provided we think you may have a broken firing pin or spring.

There also could be a burr present in or very near the bolt face firing pin aperture or the pin may be heavily fouled within the bolt. Try this: Remove the bolt, flush it out several times with mineral spirits, warm the exterior to dry the interior, lightly lubricate the interior and test for free movement of the pin and spring. If there are no

hitches, both pin and spring are probably OK. Otherwise you'll likely have to replace them.

Call Nu Line Guns, a former Winchester Service Center, at and ask to speak with Jerry Stevens. He may have the replacements needed. J. C. Higgins(FN) Sight Removal I have a J. C. Higgins Model 50, which I think is a Model 98 made by FN, with a chrome lined chamber and bore. I would like to remove the front sight ramp and rear sight base, which I assume are silver soldered on. I would like to know if I can apply enough heat to loosen them without damaging the chrome lining of the bore.

El Paso, TX Savage, High Standard, Marlin, Sako and Browning all provided shotguns for the J. C. Higgins line-up. Our cross reference files show no mention of FN. Better check in with the NRA Museum (Waples Mill Road, Fairfax, VA 22030, nramuseum.com) with a note asking who was the original manufacturer of the Higgins Model 50. After you get that information, contact the specified manufacturer. The front sight may not be soldered on. It could be threaded or press fit.

They could also advise you on the metallurgy of the chrome lining and how much heat it could stand if indeed the sight is silver soldered on. Include a stamped, self addressed return envelope with your query to the museum. It might better assure a

prompt reply. CZ70 I recently purchased a CZ70 pistol kit and I have some questions about fitting the hold open latch and ejector (part 12 in the parts reference guide for the CZ70.) There is a tab on the bottom that is bent 90 degrees.

From the top of the ejector to the bottom of the tab should measure how much? How far into the magazine well should the tab extend? The slot in the frame the tab fits into should be how deep? Ronald H. Whittaker Your query causes us to bring up a few questions. If CZ is the maker of the kit we are curious as to why the measurements you request were not included with any instructions that have, or should have, accompanied it. Or aren't said details really that critical?

If they are, they were never brought to our attention by CZ-USA technicians during conversations held in preparation for publishing article(s) on disassembly/ reassembly of CZ pistols and we have no other data beyond those conversations. However, your stated concern is worth following up. As long as the kit was produced for sale by CZ and no other entity, CZ technical types ought to have no objection to providing the dimensions you ask.

Big reason: CZ- USA is as eager as all other providers of firearms, in your case a kit, that might be assembled incorrectly and result in litigation. AG Don Finch

SEARCHABLE ISSUE RECORD

Archive index

Invite Someone To Shoot American Gunsmith Editors	2	The Relationship Of Barrel Extension Diameter To Accuracy In The AR-15, Part 1 Joe Carlos	14-17
The Winchester Model 1887 Chick Blood	3-6	Tracking Point John M. Buol Jr.	18-22
Colt Gold Cup Robert K. Campbell	7-10	Reader Forum American Gunsmith Editors	23-24
Save Your Receipts! Joseph Reichert	11-13		

Rights and corrections. Images without confirmed permission remain reserved in place. Authors, photographers, and rights holders may contact editor@gunsmithmag.com. Corrections to searchable text are tracked against the source-page record.



American Gunsmith

The complete searchable archive of a technical journal devoted to craft, repair,
maintenance, machining, and restoration.

GUNSMITHMAG.COM • EDITOR@GUNSMITHMAG.COM