



JAN 2013

DIGITAL ARCHIVE  
EDITION

# PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

A TECHNICAL JOURNAL OF CRAFT, REPAIR & RESTORATION

01

ARCHIVE ISSUE NUMBER

INSIDE THE ARCHIVE

# REVOLVERS AND SPRINGS

PITTMAN-ROBERTSON ACT • SAVAGE RASCAL • CROSSBOW CRANK COCKING SYSTEM • EXTREME STOCK REPAIR

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 109

DIGITAL ARCHIVE EDITION

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# AMERICAN GUNSMITH

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## IN THIS ISSUE

# Contents

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

---

**2** Pittman-Robertson Act  
AMERICAN GUNSMITH EDITORS • ORIGINAL PAGES 2

---

**3** Savage Rascal  
CHICK BLOOD • ORIGINAL PAGES 3-7

---

**8** Crossbow Crank Cocking System  
NORMAN E. JOHNSON • ORIGINAL PAGES 8-11

---

**12** Extreme Stock Repair  
PAUL MAZAN • ORIGINAL PAGES 12-15

---

**16** Revolvers And Springs  
ROBERT K. CAMPBELL • ORIGINAL PAGES 16-20

---

**21** Model 87 Ithaca Deerslayer Scope Mount  
NORMAN E. JOHNSON • ORIGINAL PAGES 21-22

---

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

## RESTORATION

# Pittman-Robertson Act

BY AMERICAN GUNSMITH EDITORS JANUARY 2013

ORIGINAL PP. 2

The Pittman–Robertson Federal Aid in Wildlife Restoration Act, created by Nevada Senator Key Pittman and Virginia Congressman Absalom Willis Robertson, was signed by Franklin D. Roosevelt on September 2, 1937. Hunters play a vital role in funding wildlife management and conservation. Hunting is conservation and there is no greater proof of that than hunters who successfully lobbied government so many years ago to tax themselves for the benefit of wildlife.

Prior to the Pittman–Robertson Act, many species of wildlife were at or near extinction levels. The Act took over a pre-existing 11% excise tax on firearms and ammunition, however, instead of going into the US Treasury, the money is kept separate and dispersed via the Secretary of the Interior to the States based on a formula taking into account both the area of the state and its number of licensed hunters.

Notable species that have been brought back from the brink of extinction since the implementation of this act include white-tailed deer, wild turkey, and wood ducks. Philosopher George Santayana famously stated that those who do not learn from history are doomed to repeat it. Hunters learned and they acted. The Act raises more than \$280 million a year for wildlife conservation and has raised more than \$2 billion since its inception.

Revenue from state licenses and fees adds up to about \$275 million a year, which goes exclusively to state fish and game departments for conservation purposes. S. 1249: Target Practice and Marksmanship Training Support Act is a bill to amend the Pittman-Robertson

Wildlife Restoration Act to facilitate the establishment of additional or expanded public target ranges in certain States.

Because the expansion of America's urban and suburban areas has crowded out many shooting areas and made it increasingly difficult to find a place to shoot, Senators Mark Udall (D-Colo.) and Jim Risch (R-Idaho) introduced this a bill to allow the construction and maintenance of target ranges on public lands with Pittman-Robertson funds. In the House of Representatives, Heath Shuler (D- N. C.) and Duncan Hunter (R-Calif.) introduced a companion bill, H. R. 3065.

The bill has been introduced and has been assigned a congressional committee. Additional Article Online ([americangunsmith.wordpress.com](http://americangunsmith.wordpress.com)) Dale Pereira & Pete Marut of Connecticut Spring and Stamping ([ct-spring.com](http://ct-spring.com)), a Farmington, CT company with more than 160 firearms industry customers submitted an article we didn't have room to print.

Entitled Making Quality Firearms Parts Requires Expertise in Design, Prototyping and Manufacturing, it is an overview of the making of firearm springs and stamped parts, development and prototyping involved in making parts and manufacturing processes as they apply to part quality and consistency.

The company makes every manner of firearm spring, as well as slide-stop assemblies, interceptor latches, magazine tube assemblies, saddle rings, speed latches, action bars, sights and trigger bars for many different hand guns and rifles, including the AR15/M16 rifle platform.

## RIFLES

# Savage Rascal

*When choosing a youth rifle, sometimes what seems to be simple isn't as simple as it seems, but you can get lucky.*

BY CHICK BLOOD JANUARY 2013

ORIGINAL PP. 3-7

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I don't mean that as a one-line definition for the new Savage Rascal. Sure, it's a .22 caliber youth rifle. There's no advanced rocket science required in working up and peddling one of them. I suppose that's one reason why there are quite a few being dangled in the marketplace, right? Only partially right. There are youth rifles and those that claim to be youth rifles, if you know what I mean. I happen to own a youth rifle. It cost my Dad five bucks brand new when he bought it for me. I was five years old.

He taught me to respect guns and how to shoot with that little Winchester Model 60A. Seven years after he gave it to me I won my first Boy Scout Merit Badge with it. It can still print five shots inside a ten ring at 50 yards with the original iron sights.

On one occasion, using premium ammunition, it outdid my Anschutz 1413 at 25 yards, but I've since donated that Anschutz to a charity raffle (yeah, I'll take a tax deduction.) Like the Anschutz, the Winchester is a single shot, historically and actually the most accurate among rifle actions. Unlike the Anschutz, it is small and light. Once a year it returns to the range during an open-to-the-public fun shoot at my club.

There, junior first timers line it up on balloons, severely shaken-while-full soda cans and rimfire metallic silhouettes. Except for

that, it has been semi-retired to a permanent place in my vault. It is not for sale. A few months ago, my brother-in-law called me regarding a youth rifle suitable for his son, Theo.

I told him it required a firearms ID card. We can think of no better way to eliminate tiffs over which Rascal is whose during a youthful shooting session. For him to purchase any shoulder arm in his state of residence. The brother-in-law is a superb recording engineer who can make the worst croaker and stringed instrument plunker sound like music made in heaven. He has little interest in firearms other than the usual concerns regarding his son having, caring for and shooting one.

I told him I'd think over his request and get back to him with a recommendation. As I started this article off by stating, things aren't always simple as they seem. A studied response required checking out a number of youth rifles. A few requirements I predetermined. It should be a single shot, a cock-on-opening bolt action, properly sized, side-mounted safety, an outstanding trigger, a highly visible cocking indicator and adjustable sights.

The trouble was I had no time to spare for a comparative, model versus model search. My brother-in-law had a schedule worse than mine and lacked the knowledge for making a similar evaluation. Where could I

turn up a youth rifle with all those attributes produced by a reliable manufacturer with a rapidly growing reputation for achieving accuracy? At the 2012 Shot Show. When I'd first spotted it in the exhibitor's booth I suspected they'd come up with a knock-off of my old Winchester.

On closer inspection, I quickly saw there was no comparison other than weight. What I was looking at was a newly developed and produced entry into the youth market from Savage Arms called the Rascal. They could have chosen "Imp," Sport, "Buddy," or any number of pet-like names. To me, "Rascal" promises equal fun with no loss in the pleasures of a lasting friendship. Sure, it costs more than my Winchester. Name one thing that doesn't after all these years. Field Stripping Place the safety ON.

Hold the trigger firmly to the rear. Open the bolt. While maintaining the hold on the trigger, withdraw the bolt from the receiver. Check the serial number on the bolt. It will be composed of four digits which should match the last four digits of the rifle's serial number. If not, something is awry and the bolt you have wasn't supposed to be sent out with that specific rifle. Savage gauges the bolt to fit each rifle they ship from the factory and marks the bolt accordingly. If any Savage bolt action is handed

## SAVAGE RASCAL CONTINUED

ORIGINAL PAGE 4

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over to you with a mismatched bolt/ rifle serial number, call Savage right away. The gun may have to be returned and a new bolt fitted. Remember what I said about the rifle cocking when the bolt is opened? The bolt has to be uncocked in order to dismantle it beyond field stripping. Unfortunately, there was no exploded view of the bolt itself available to us and the cocking piece is not identified in the main schematic. It's the black "button" sticking out from the bolt.

When the bolt is uncocked, the button will rest in the upper, forward section of the bolt cut out at the base of the bolt handle. When cocked, the button is in the same cut out on the bolt but is positioned on the opposite

side and to the rear. Maintenance may require you to manually decock the bolt. Lock it between padded vise jaws with the bolt handle straight up.

Using a nylon drift, tap lightly on the cock- B They are roll pins and can be drifted in either direction with roll pin punches. ing lever, moving it into its notch at the base of the handle. The factory guys decock it another way. The bolt handle is positioned straight up, the bolt held in two hands and the cocking lever pushed downward against the edge of the work bench, dislodging it from the cocked position.

I figure I wasn't doing it exactly as it had been described so the cocking lever fought me like a little demon and stayed put. Maybe my work bench isn't built exactly like it must match the last four digits of the rifle's serial number. A Athose up in Westfield, MA so I used a nylon drift. The bolt innards are now accessible. If deep cleaning is necessary, it will occur after you separate the stock from the barreled action. For this, a 9/64" Allen wrench is used to loosen and remove the two stock screws (19C, 19D).

The stock and action should separate easily. Any small stubbornness can be eliminated by bumping the underside of the barrel just beneath the front B A

## SAVAGE RASCAL CONTINUED

ORIGINAL PAGE 5

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A Asight on a bench pad. The Accu Trigger will remain attached to the receiver. We'll discuss that unit further in a bit. Detailed Disassembly As you'll discover here, there is little to an intensified take down of a Rascal. Since we don't have a separate schematic of the bolt, however, please refer to the photographs of the bolt and its included callouts. First to go is the end cap. If the bolt is still cocked the cocking indicator protrudes out the back end of the cap.

Since the photo is of a decocked bolt, the indicator has withdrawn and left a recess behind. Insert a #4 Mag Na Tip hex bit or its equivalent into that recess. As hard as I was able to crank counter-clockwise on that bit with the longest driver in my stash, the cap wouldn't budge. A phone call to Savage explained why. The cap is secured during final assembly with Loctite. Thankfully, the blue variety is used exclusively, which requires less heat than red Loctite to defeat it.

If I had to apply that much flame to the cap end of The stud (B) supports the loading ramp and captures its spring. No replacement parts are made available for the Accu Trigger assembly (C). The entire unit must be replaced should breakage occur. Note the clips retaining it in the housing. They require a 9/64ths hex wrench to remove and present no problems in backing them out. the bolt it might weaken the mainspring inside. I remained cautious and shunned using any of my large propane, MAAP gas or welding torches.

The little butane one I had on hand would do just fine, providing a 30 second warm up to the bolt body just below the end cap. Back in went the hex bit on the end of the long handle. Still no action. I took my 1/4-inch ratchet wrench and attached the hex bit with a Brownells Magna-Tip adapter. Into my padded bench vise went the bolt, cap-end up-

ward. Thirty The text explains what goes on inside the assembly (B). Trigger adjustments (C) are made with the factory provided tool.

It's longer than a Rascal by eight inches, weighs the same, lacks the trigger/sight systems. However, it still is a tackdriver and no youth is ever going to pry it out of my vault. Aseconds of heat and a half turn with the wrench later the cap surrendered. You might want to add these tools to your inventory. They have come in very handy for me when faced with fasteners wearing Loctite on their threads. The mainspring will pop partially out when the cap is removed.

I didn't expect it would totally expel itself from the bolt. I was correct. The bolt is now set up for a complete take-down. Withdraw the mainspring. The cocking indicator, a rod with ahead at one end,

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usually comes along with it. The extractor pin (12E) retains the extractor, its spring and partially does the same with the firing pin (11G). Drifting out the firing pin retainer (11L), however, allows you to extract the firing pin from its bottom slot in the bolt. The cocking knob is retained in the hammer by a small roll pin. Align the pin holes so you can see clear through the bolt. Drift out the pin in either direction. Lift the cocking knob free. The hammer can be slid out where the end cap once dwelled.

The rear sight assembly should require no detailed instruction. Just study it before you start breaking it down into its separate components and beware of lost springs. Better yet, the photo included here will give you a very good idea of how the sight assembly should appear when remounted to the receiver. Savage Accu Trigger Up until about 2003, this tremendously successful design wasn't available on rimfire rifles.

Knowing a really good youth rifle should boast a really good trigger system, it is standard equipment on the Rascal. As with any Savage rifle so equipped, the Rascal comes with a small tool allowing its owner to adjust trigger pull weight. The tool is quite simple, consisting of a knurled cylinder with a short rod extending upward

from it. The rod has been machined to engage a spring in the rear of the Accu Trigger assembly. To increase pull up to 6 pounds the tool is turned clockwise.

You've reached maximum when the spring makes a clicking noise. Pull can be lightened to about 1.5 pounds when the tool is rotated counter-clockwise. You've reached minimum pull when the large coil of the trigger spring comes into contact with the upper rear surface of the trigger. These limits should never be exceeded.

For the sake of safety, both Savage and I recommend settings from 1.5 to 3 pounds be restricted to Figure 2, when the bolt is cocked the sear sits on a step at the rear of the trigger and is in contact with the sear stop lever. Figure 3, continuing to pull the trigger rotates it and the sear stop lever under the sear. The hammer is allowed to fall. Figure 4, all the movement diagramed can occur only after the trigger blocking safety has been moved to the "Fire" position. well supervised precision shooting.

Heavier trigger weights may be more suitable for field shooting. Education is a wonderful thing when an Accu Trigger is the subject. For that reason I have included a set of blueprint drawings provided by

Savage to further explain how the trigger system functions. While the design has been modified, these illustrations detail how this system works. Starting with Figure 1, what appears to be a Glock Safe Action trigger is really a sear stop lever. It teams up with a slot milled near the end of the trigger.

Figure 2 shows when the bolt is cocked the sear sits on a step at the rear of the trigger and is in contact with the sear stop lever. Figure 3, continuing to pull the trigger rotates it and the sear stop lever under the sear. The hammer is allowed to fall. Figure 4 details that all the movement diagramed can occur only after the trigger blocking safety has been moved to the "Fire" position. What happens if the rifle is dropped while cocked and the safety is disengaged? Nothing.

The sear lever still blocks the sear. Why? The trigger hasn't been pulled. All things considered, my nephew's Dad need harbor no concerns about making a Rascal his son's first rifle. Now all I have to do is get him out of a recording studio long enough to explain why. Besides, there's no way the kid is going to end up with my Winchester. AG



Savage Rascal (Specifications subject to change without notice) Parts List Note: The Rascal owner’s manual contains schematics and parts lists covering three additional Savage rimfire rifles.

The list included here is limited to those parts identified in the manual as associated with the Rascal. 17B Front Sight Blade 18 Stock Assembly 18M Front Stud

19C Rear Action Screw 19D Front Action Screw 19K Stud, Action (Rim Fire) 20B Safety Insert/Red Ball 20K Loading Platform/Fed Ramp 20KK Feed Ramp Spring 20L Rear Action Stud 11G Firing Pin 11L Firing Pin Retaining Pin 12E Extractor Pin 12L Extractor 16E Sight Bracket 16F Rear Sight Locking Screw 16G Rear Sight Aperture 16H Aperture Nut 16L Rear Sight Pivot Screw

## FROM THE ARCHIVE

# Crossbow Crank Cocking System

*We find improvements on existing equipment used in shooting and hunting. I recently found one with a crossbow.*

BY NORMAN E. JOHNSON JANUARY 2013

ORIGINAL PP. 8-11

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While observing a number of different crossbows being cocked, I could clearly see a need for a better way this could be accomplished. Cocking a 150-175 pound crossbow via direct pull, with both hands, requires considerable strength. The next easiest method is performed by means of a rope cocking aid utilizing along cord with T-handles on each end fitted to a pair of pulleys that doubled back to the bow frame to reduce pull weight by 50 percent.

Though substantially easier, this too can be quite difficult for the aging or incapacitated hunter who really needs help. As alternatives for easier crossbow cocking, there are various methods of cranking the bow by means of a pulley and hand crank. Most of these are quite effective but not totally uncomplicated to operate and most are noisy out in the woods. They are usually set up to work on one style of crossbow only.

There also are specialized cocking systems using gas cylinders and electrical devices rigged to individual crossbows that can be

quite expensive. This was sufficient to inspire the design of a universal crank-cocking system that could be adapted to a number of different crossbows, one that is safe, quiet and easy to carry and attach.

Universal Crank System Through close observation of the dynamics involved in cocking a crossbow, I was able to design a crossbow crank cocking system requiring but a fraction of the strength needed for direct hand cocking, or even the use of a rope cocking aid. The crank operated unit, made chiefly of cast aluminum, weighs only 1.5 pounds, fits in a man's hand and carries in a small pack. Only 15 seconds are required to reach into the pack and attach the crank system to the crossbow.

The crossbow can then be silently cocked in less than 20 seconds. A close study of the pictures and the following directions will show how a capable machinist or gunsmith could quite easily duplicate my efforts in making this or a very similar crank cocking system staying essentially These are threaded onto the through bolts and locked with

3/8 inch nuts. within the basic principles of design I have outlined. The frame is made from a piece of cast aluminum 2 3/4 inches wide x 2 1/4 inches high x 1 1/4 inches thick.

A square opening is cut upwards from the bottom 1 5/8 inches deep x 1 1/4 inches wide. This provides for an opening into the aluminum anchoring block which is later fitted at correct height into the stock so the bottom border of the cable spool is on the same plane as the main beam of the crossbow that guides the bow string. A 3/8-inch hole was drilled through the topside of the frame 1/2 inch from the top. This allows the bottom radius of the shaft to lock into the stock anchor block as it rotates.

The assembled unit is also locked to the stock anchor block from below with a 1/4 inch removable push pin. The two laterally opposing sprocket cable spools are made from cast aluminum 41-10-tooth sprocket stock material. As machined, these work perfectly

## CROSSBOW CRANK COCKING SYSTEM CONTINUED

ORIGINAL PAGE 9

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The lock is shown engaged in a sprocket tooth here. as cable wind spools with integral ratchet locks. A cable wind spool surface 1/2 inch wide x 3/16 inch deep is then formed into the outer side of each cable spool. A central hole is drilled and tapped through the sprocket spools to receive the 3/8 inch threaded bolt ends. These work to later solidly lock the sprocket locking spools to the threaded ends of the 3/8 inch through bolts.

The bolt ends are threaded to a thread depth allowing only for a flush fit as the two sprocket spools are later torqued into place onto the bolts. A 3/8-16 hex nut is screwed on the left end of the protruding bolt and tightened firmly to prevent spool/sprocket slippage. The right side sprocket spool is screwed in place firmly against the bolt threads until the sprocket teeth are timed together.

Once the sprockets are timed together, securely tighten two nuts against the sprocket spool on the right side to torque things in place. The two aligned nuts will then fit the ratchet crank handle. Ratchet Cable Lock And Release Apiece of 0.075-inch plate steel is used to make the cable sprocket lock and release. The locking plate fits between and into the sprocket teeth with cutout to fit the frame opening.

It is attached above via a 5/16 inch rolled curve radius hooked into the top of the plate and pivots in a groove made across the outer top of the frame. Two spring loaded 8-32 screws pass through the upper curved radius keeping the two spring locks positively against each sprocket tooth as the crank is turned to wind the cable. These same lock wings are used to release the ratchet after the

bow is fully cocked, releasing the bowstring. Two thin pads are attached under the steel plate for silent operation.

Cable, Crank and Hooks I made up a seven inch long reversible, open end ratchet wrench handle to fit the 3/8 inch hex nuts. The ratchet wrench enables the user to make partial turns of the crank while cocking and releasing the crossbow winding cables. This permits full leverage and control of the crank with minimal arm movement if desired. Special bowstring hooks are made of brass to attach the lower cable ends to the bowstring.

The pictures show the simplicity of this design, first featured in the November 2011 issue of American Gunsmith. The string hooks must be polished to prevent bowstring abrasion or scuffing of the side of the crossbow beam. With spools and bowstring hooks ready, the proper length and

## CROSSBOW CRANK COCKING SYSTEM CONTINUED

ORIGINAL PAGE 10

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This regulates the proper height of the cable spools so the cable is perfectly parallel to the bow frame. type of cable joins the two. I used 0.065 diameter, 7x7 49-strand cable, which is very strong, flexible and resistant to bending or kinking. This is much better than the commonly seen fabric cord used in most bow-crank systems. Cable attaching holes were drilled at an angle into the winding spools, set to correct length and secured with countersunk socket head set screws.

There is some cable length leeway permitted allowing the bowstring to be pulled back for cable hook attachment. It is important that the cable/bowstring hooks are set to the

same length so they pull evenly as the bow is cocked. Trying The Cocking Crank This crossbow crank cocking system is very easy to use but a few things need to be checked beforehand. Some crossbow safeties are laterally positioned on the same plane as the string and may need to be shortened to allow free passage of the bowstring hooks.

Most safeties are moved to the rearward safe position automatically as the bow is cocked. Dry firing will not occur with this crank cocking system with its independent cables. If one cable fails, the other will hold the string. Incidentally, dry firing occurs when a bowstring is released without an arrow and this

can dam- The cables are perfectly parallel to the main crossbow beam. The safety is automatically initiated here as the bow is cocked. The string hooks are removed at this stage of cocking. age a bow.

Never draw the string of any crossbow beyond the fully cocked position into the sear. Correct cocking can clearly be seen and heard as the bow is being cocked. As a bow is fully cocked, be sure the safety is in the ON-SAFE position. The bowstring hooks can then be released by relaxing the string. While a crossbow can be uncocked using this or other crank systems, it is not recommended. The usual way

## CROSSBOW CRANK COCKING SYSTEM CONTINUED

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At center are the cable hooks. The through lock bolt is in position to lock the unit to the bowstock and the crank is an open end reversible ratchet. is to shoot an arrow into the dirt or other safe backstop. Most hunters use an old or damaged arrow for this purpose.

Crossbows are inherently safe and quite easy to use if used as designed. As with firearms, reasonable precautions must always be practiced in the use of a crossbow and its accessories while cocking, handling and shooting.

The safety of any firearm or crossbow should not be released until ready to shoot. This may be the easiest single-stage crossbow cranking system available. The unit

enables the user to attach and cock a full power crossbow in a half minute. Though the crossbow has increased in popularity, with extended hunting seasons in many states, permits are often limited to older and disabled persons. Not all shooting aids have kept up with the times, making some crossbows difficult to use.

Anything that can be done to make the crossbow easier to use must be considered. Whether purchased or built by a machinist/gunsmith or hunter, any form of improved cocking system ranks very high on the list.

## MAINTENANCE &amp; REPAIR

# Extreme Stock Repair

*Old oil soaked wood stocks are hard to repair successfully unless you know these tricks.*

BY PAUL MAZAN JANUARY 2013

ORIGINAL PP. 12-15

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**H**ow many old stocks have you seen that were broken at the wrist, repaired and then broken again? If you have been around guns for very long I'm sure you have seen your share. Based on the number of badly repaired old stocks that I have worked on, most folks think all it takes is some glue and perhaps a few screws and a splint or two. When the gun breaks in the same place a time or two they give up the job and put stock repair into the black arts file.

Generally, by the time the gun gets to me the owner has given up hope and simply wants to sell the gun. The few that I quote a repair on are generally of sentimental value to the owner and are obscure or rare enough that no replacements stocks are available for them. They come in with wire wrapped around the broken wrist like a cast.

Strips of wood or metal inletted across the break and screwed and or glued in place, rawhide wraps, metal bands and sometimes a combination of several of these attempts and there is always evidence of glue—lots and lots of glue. Many of these repairs were brilliantly thought out and expertly executed but still failed and even if they held they

were downright ugly. The reason for the failure is generally simple to detect. Over time the wood has absorbed a lot of oil.

Oil originally swabbed into the bore to prevent rust has run down the stock and been soaked up by the wood. Any gun not stored muzzle down is eventually going to have the stock become oil soaked. In a lot of old doubles, the oil itself has been a contributing factor in the stock breaking in the first place. The previous owner had given up on fixing it. The first lesson in stock repair is that glue, no matter how good, will not stick to oil.

So, the first job in repairing a stock is to remove every possible trace of oil from the wood. You may think you already know how to do that. There are plenty of products on the market that are great at removing oil on or near the surface. Oven cleaner, paint stripper and bleach are just a few of those I have used.

If you use one of these and glue up the stock, chances are that within a few weeks more oil will migrate to the surface and the joint will eventually fail when the oil soaks into the wood where it is in contact with the glue. If you don't believe this, next time you have cleaned up an oily stock with oven cleaner try heating the stock over a

stove or with a heat gun. I'll bet you see oil bubbling up to the surface. Besides being ugly, screws in the stock never seem to help for long.

Recoil vibration through the wood loosens them and walnut is soft enough to crack around them. A screw hole is a weak spot. As the screws vibrate and move they leave more damage than you started with. Now that we have looked at what doesn't work, let's take a look at something that does. Remove the stock from the gun and take off all butt plates, recoil pads, grip caps, nuts, bolts, nails, rawhide, clamps, plastic model airplane parts or whatever type of old repair material.

Now, you may simply have a cracked stock with or without missing pieces of wood or you may have one actually broken in two or more pieces. I can't anticipate every possible combination of problems so I will simply address wood preparation that will allow an adhesive to work. Once the stock is off the gun and all we have is the wood, start the enhanced interrogation with what I will call "water boarding." Scrub the living daylights out of the wooden stock using hot water, soap, and a cleaning brush.

**ANY SOAP WILL DO AND ANY STIFF  
NYLON BRUSH WILL BE**

## EXTREME STOCK REPAIR CONTINUED

ORIGINAL PAGE 13

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When I removed the grip cap I found this inscribed on the underside. just fine. This operation will remove dirt, grease, grime, oil, and any oilbased finish. After giving it a good scrub, rinse it in hot water and dry it off with an old towel. I will often do this several times allowing the stock to air dry between water boarding sessions, concentrating on any areas that are still darker than the others.

Usually the end grain and inletting for tangs, trigger plates and sidelocks, if present, require extra attention. When I am sure I have removed as much dirt and oil as the soap will get, I evaluate the stock. Any darker areas in the inletting, the broken sections, the front

where the receiver meets the wood and the end of the butt that was under the buttplate or recoil pad get sprayed with oven cleaner.

Let the oven cleaner work for at least twenty minuets, wash it off, let the stock dry, and repeat as often as necessary. If you're lucky and the gun is fairly new you may be able to stop here. Personally, the guns I get always seem to be older than the dirt I just removed from them. By this time any pieces of wood that had been glued on should have come loose.

Check every surface that was glued and use a dental pick or other sharp pointed thing to probe every nook and cranny and remove every trace of old glue that you can find. The

smoothly cut stock left little surface area to work with. Rather than the smaller repair pins, I used 3/8" all thread rod to hold the wrist together. At this point you are probably sure that you have removed every molecule of oil that ever came within ten feet of the stock and you are ready to start putting it back together.

Chances are you're wrong. To check, heat the stock again and I'll bet you will still have oil coming to the surface. If I am wrong, then you truly lead a charmed life and the gunsmithing gods are smiling on you. Ah, but if ye find that thee are still but a mere mortal and the

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devil's petroleum still bubbles forth from yon wood, it's time to quit fooling around and get serious. Up until now the job has been pretty labor intensive so, lets break out our old witch's caldron and use a magic potion of our own to do some of the work. First you'll need a caldron, or at least a container large enough to submerge your wood in. If you don't happen to have a bluing tank handy you can look at the home center or nursery for a one piece plastic flower box, a chicken feeder or something similar.

Put the wood into the container, weight it down, and fill the container with turpentine until the wood is completely covered. Cover the container because turpentine really stinks and evaporates rapidly. Actually, if you're married and try this in the house you may find yourself and your project living in your truck. It might be best to do this in a garage or shed. Now walk away for two weeks. OK, you can't leave it to just soak without checking on it at all.

Every day or two you can remove the cover and scrub the dickens out of it just to see how it is going. The idea is for the turpentine to completely soak into the stock and displace every drop of oil it can. At the end of the two weeks remove the wood, scrub it with soap and hot water again and hang it in the garage or shed to dry for a week. By then most of the turpentine fumes will have dissipated and you will be able to get within three feet of the wood without your eyes watering.

Now, if you're a wimp, I will mention that I have experimented with odorless mineral spirits once. It seemed to get the same effect with a fraction of the smell but turpentine is less likely to damage the wood. Besides what fun would it be if you didn't have that terrible smell? Finally, we come to the actual repair part (had about given up, hadn't you?).

Your main repair materials will be Brownells Acraglas Gel (or any other inferior epoxy of your choice) and Stock Repair Pin Kit (Brownells #080-565-093AD.) In the case of a really difficult repair I have also used a 3/8" all thread rod cut to length. The trick is to locate the pins or rod in the center of the largest area of the broken stock. The top gun is a Parker Trojan and has had thousands of rounds put through it since the repair. The middle gun has been shot extensively in Cowboy Action shoots.

The bottom gun is newly repaired. Follow the instructions in this article and the repairs are permanent. Drill holes that are oversized and deep enough to accept the reinforcing rods and allow enough room to align the stock. Drill the holes, put the pins in them and fit the stock together. Now is the time to find out if you need to make the

holes deeper or bigger to properly align the pieces. If there were inletted splints of wood or metal, make strips of matching walnut to fit the inletted areas. Once you are able to put the stock together and get it properly aligned, degrease the holes you drilled with a fast evaporating degreaser like Birchwood Casey Gun Scrubber. Yeah, I know, you just soaked the stock for two weeks to be sure there was no oil in it, so why do you need to degrease it again?

Because it takes two seconds and a stitch in time saves nine, there's no sense closing the barn door after the horse is out, guys that wear belts and suspenders rarely lose their pants and because I said so. Spread plenty of newspaper around because things are about to get messy. Wear an apron and disposable gloves. Don't say I didn't warn you! Mix the Acraglas Gel according to the directions and dye it Complete your American Gunsmith collection. Or read up on a special subject! A limited number of the following

ORIGINAL SOURCE PAGE

15

## METALWORKING

# Revolvers And Springs

*Shortcuts don't work in shooting or gunsmithing. Learning good revolver action work yields better results than trying to drop in a quick fix.*

BY ROBERT K. CAMPBELL JANUARY 2013

ORIGINAL PP. 16-20

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When it comes to challenging a shooter nothing does so quite like a snub nose .38 or a lightweight magnum revolver. Each is light, kicks more than other revolvers and the short sight radius makes marksmanship more difficult. There are always folks looking for a shortcut to proficiency but there are no shortcuts. Quality firearms are not inexpensive but skill at arms is purchased with a different coin. Unfortunately, short cut attempts can lead to problems.

We sometimes find shooters replacing the revolver mechanism springs in a pursuit of a smoother trigger action. This can leave the revolver no longer reliable and it ends up in our shop. My basis for a fix is to start over and dump any suspect parts. If you do not have good information as to the quality of the springs or where they came from or which ones were changed, you probably need to replace the whole set. A quality set from Wolff Gunsprings ([gunsprings.com](http://gunsprings.com)) solves a lot of problems.

This at least restores the original operating condition. When working with Smith and Wesson revolvers we need to have suffi-

cient spring force to crack the primer. Different models use different types of mainspring and both leaf and coil springs must be understood. I never change the mainspring of a double action revolver for a lighter version without accompanying action work. Never! If the mainspring has worn, such as with a 1950s vintage Jframe I recently worked on, I use a full power version from Wolff.

Just the same, when we find a revolver that is not as smooth as desired and the initial thorough cleaning doesn't improve that, we need to look further. My rule is for a revolver refurbished without action work I use all top quality, original strength springs. For a revolver with a good action job, full strength springs may still be used for maximum reliability.

Lower power springs may only be used when the action has been smoothed by hand work to the point that the smoother action is still reliable with lighter springs. In short, the force imparted by the firing pin, whether hammer mounted or frame mounted, remains approximately the same.

There are some tricks that work well for the occasional unusually heavy trigger action.

In my experience, the stainless steel Model 66, 681, 60 and others seem to exhibit a heavier trigger action than blue steel revolvers of the same design and model. I have developed a technique that works well with lightening the action while maintaining the proper trigger action. If necessary, I bend the very tip of the mainspring just enough to be perceptible. This usually makes for a slightly lighter action while maintaining the ability to crack hard primers.

I do not like to adjust strain screws if the revolver is firing on demand but if the action is unusually heavy I may back off the spring strain screw a quarter turn—no more—for adjustment. The revolver must then be checked for function and if there is any problem at all return the spring strain screw to the factory setting. It is important to understand that some primers are more difficult to crack than others. When testing I

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normally use my own handloads using CCI Magnum primers. It is no criticism that CCI Magnum primers demand the greatest force to crack as the heavy cup is needed to prevent pierced primers when these primers are used in the heavy loads they are specifically intended for. Magnum primers simply have a greater flame pressure—hotter and longer—which is necessary to burn large charges of powder.

Understanding that Magnum primers will increase pressure in standard loads, I work up a few standard pressure loads of known reliability for testing .38 Special revolver reliability. In the .357 Magnum full power loads are used. If the revolver tested will crack CCI

Magnum primers they will crack anything else. If you do not handload most foreign-produced brands have harder primers.

**Handgun Geometry** When you look at the Jframe revolver and especially the “hammerless” revolvers—they are actually concealed hammer designs—you will see that a lot of springs and mechanism are packed into a small package. The hammer of the Smith and Wesson 442 is designed to hide within the receiver hump and demands a special design to be effective.

If you decide to do a trigger job on the Jframe lighter hammer springs may be used only if you also do a successful trigger job as simply changing to a lighter hammer spring will re-

sult in misfires because the original parts and roughness. When the hammer and trigger contact points are well polished and honed a lighter hammer spring is sufficient to break the friction of the action.

Conversely, performing only the action job and doing so properly will result in a smoother action that retains its reliability without changing the action springs. There is really only one way to do it right. With sufficient skill and polish in the action aftermarket springs may be the icing on the cake. Without proper action work they are a spoiler. A misunderstood and often misapplied spring resides within the rebound block. This is the trigger return spring. The trigger return, also

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called the rebound spring, is responsible for the reset of the double action trigger. Fire-reset-fire-reset is the cadence that accomplished double action shooters rely upon. The rebound block is typically located under the hammer. The trigger is run forward from the most rearward position after firing by the rebound spring. The square bump on top of the rebound assembly is called the seat by factory personnel. The rebound also performs another function.

The bump on the top of the rebound meets a similar bump on the hammer. The rebound helps move the hammer out of the line of contact with the cylinder, allowing cylinder rotation for following shots. You can imagine what will happen if the trigger rebound spring is too light. The trigger will not prop-

erly reset and this is the most obvious symptom of this problem. The hammer may also not be moved to the rear as needed, resulting in binding.

The trigger may even move to the rear and stay there and not return to the forward position if the rebound spring insufficient strength. This little rebound does more than most shooters realize it does. A tool well worth purchasing is the Brownells S&W Rebound Slide Spring Tool (part #080-666-000WB). This part alleviates the common chore of making such a tool from a screwdriver and can be had for about \$20. The only proper course of action when doing an action upgrade is to carefully polish both the hammer C.

Wolff reduced power spring kit is a great option for competition and sometimes for service, providing the gunsmith has done his part. Fix one you probably can fix the other. and the rebound to mirror polish. The square on the rebound and on the hammer must be polished, making certain to maintain original geometry. Once this is done, the twelve pound Wolff replacement rebound spring may be used, but not before.

Brownells also offers a spring replacement kit designed by Walter Wolff (a good choice to have in stock) as well as an upgrade combination of springs and parts at which includes a pair of Hogue grips at a fair price. These kits are an excellent combination for those who

## REVOLVERS AND SPRINGS CONTINUED

ORIGINAL PAGE 19

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This one needs to be cleaned as well. wish to upgrade their lightweight snub nose revolvers. Getting The Revolver Ready A revolver isn't dreadfully complicated to clean but judged by some of the revolvers that come to the bench folks do not know how to clean them. I have a program that I believe works well for cleaning any firearm. Before I move to solvents and other wet cures I begin with the dry treatment. This means a brush and a clean cloth designed for gun cleaning.

It is a simple matter to remove the cylinder from the crane in the case of most revolvers. The stocks should be removed at this point as well. With the cylinder off and laid aside, inspect the breech face. The breech face, front of the cylinder and blast shield often have plenty of accumulated crud from lead

bullet loads and incomplete powder burn. A dry bronze cleaning brush is a good tool to use here.

I do not resort to a chisel as this may mar the finish but I carefully use the brush to clean deposits at this point. Once the crud is removed with the dry process we move to using Hoppes with the wet solution. Only by first properly cleaning the revolver will we be able to accomplish a good trigger action. I know folks should clean their own handguns but many times it is left to the gunsmith to do so. This is simply something we must do correctly and must charge the client for doing.

When cleaning a revolver it is important to run the brush not only through the bore but also through each cylinder separately. The

front The revolver at top is for concealed carry and wears Pachmayr Compact grips. The four inch Combat Magnum, bottom, wears Hogues Monogrips, excellent duty grips. The right accessory for the right job. of the cylinder gets its share of attention at this point. The breech face and forcing cone must be addressed as well.

There is often a strong build up of lead deposits in the cylinder, especially when the shooter has fired large amounts of .22 Short rimfire in his .22 caliber Long Rifle cylinder, .38 Special in the .357 Magnum or .44 Special in the to clean the cylinder is to place the cylinder in a padded vice and hook the cleaning rod to a drill. Set it for the slow RPMs and carefully clean the cylinder. Remember;

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do not push the brush out of the cylinder. Run the brush into the cylinder about where the cartridge case headspaces. If you run the brush all of the way out of the cylinder you will compress it and it will not be good for very much more cleaning. Once the revolver is clean, there are a number of means of adjusting revolver spring tension and all seem to work for various practitioners. A rebound

spring that is too light or too heavy in particular will really do a number on good function and smoothness.

In the end, the polish and sometimes bending of the main- This is good medicine for dealing with hard kicking .38 snub revolvers. spring is what works best for most. For a full blown action job on the K frame shortening the strain screw also pays dividends. Of course, action jobs come out best when the revolver is of good quality and properly set

up from the factory. When you have a dragging cylinder or a revolver that drags on one chamber more than others you are going to have more trouble.

This is when we earn our pay. When addressing the revolver action job remember only a thorough job is worth doing. Simply replacing springs is not something that we need to be doing. We must do the business correctly by improving the action first and the springs only as necessary. AG

## SHOTGUNS

# Model 87 Ithaca Deerslayer Scope Mount

*deer guns for a long time, but an optical sight makes them even better.*

BY NORMAN E. JOHNSON JANUARY 2013

ORIGINAL PP. 21-22

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The Model 37 Ithaca Deerslayer shotgun was renamed the Model 87 Deerslayer from 1987 through 1996, after which time the Model 37 designation was resumed. Both models were equipped with open sights from the factory, including an adjustable rear leaf sight allowing ample room for a scope or red dot optic without disturbing the open sights. There is ample room for a one-piece scope base on top of the receiver bridge, which must be drilled and tapped.

**Base Selection And Mounting** The Weaver number 62 one-piece base (part number 48062) is fully adaptable as a sturdy scope

base for this shotgun. The Weaver no. 62 one-piece base has four screw holes, which allows The shotgun receiver must be drilled and tapped for the four 6-48 screws. the front and rearmost screws to fit the span between the rear of the barrel, at the front, and the extractor position of the open bolt to the rear.

There is ample screw thread depth into the receiver just above the top extractor groove of the receiver. Screw threads must not enter into this groove, however, and must be shortened as needed to obviate this. In mounting the scope base the in-line set of holes are positioned with the front screw located imme-

diately rearward of the barrel margin. There is sufficient room, so don't crowd this screw forward.

The receiver of the Model 87 shotgun is not case-hardened, permitting the use of a standard 6-48 drill and tap. For this type of base mounting, drill and tap the front screw hole first and attach the base securely with this screw. From there use a straight edge and align the base coaxially with the

## MODEL 87 ITHACA DEERSLAYER SCOPE MOUNT

## CONTINUED

## ORIGINAL PAGE 22

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barrel and receiver. Then, with the base in place, drill and tap the remaining three holes. As you fit each screw, double check that screws don't protrude beyond the inner groove surface. Torque screws down per screw size recommendations. Many guns are brought in with broken or over tightened screws, particularly screws with Torx heads. The use of a torque wrench is advisable. Screws must not protrude through the inner wall of this groove.

The extractor is seen at the right side of the groove. 48062 scope base must be attached for proper screw hole placement on the Ithaca Model 87 Deerslayer shotgun. This results in a fine shooting combination. Unless a scope is very heavy or the gun has extraordinary recoil, you won't need a bonding agent like Loctite or the like. The lighter weight red dot optics certainly don't need this treatment. Both scope height and eye relief work out nicely with this mounting system.

The scope base position on the receiver allows for optimal eye relief for both standard scopes or red dot optics. There are several reasons for mounting optics on shotguns, such as improved accuracy, better viewing (especially in poor light) and the help it provides aging eyes. Some hunters don't get this kind of job done because it appears too involved, but it is usually a pretty straight-forward gunsmithing job on most shotguns, including the Ithaca Models 87 and 37. AG

## RIFLES

## Reader Forum

BY AMERICAN GUNSMITH EDITORS JANUARY 2013

ORIGINAL PP. 23-24

**H**enry .22 Repeating Rifle I have three rifles in my shop that were in a house fire. The only damage is cosmetic, being surface rust and a need for rebluing. The Marlin and Mossberg can be taken down but I don't have info on the Henry lever action .22. Have you done a story on disassembly and reassembly? The major problem is the receiver and cover made of aluminum and I need to remove the barrel. As for refinishing, the trigger on the Marlin was gold. Is there away to give it back its color?

The damage to it caused pitting from rusting underneath. We covered the Henry rifle in the October 1997 issue. No reprints are available that far back but we are publishing your need for it with your email address. Another member could have the article and be willing to send a copy. The original Henry, which played such a significant role in the history and success of Winchester Repeating Arms, had no receiver cover or receiver made of aluminum. We further do not believe it was ever produced to chamber .22LR.

This leads us to the conclusion that you are referring to the Henry Repeating Arms Golden Boy. We covered that one in the February 2004 issue. Reprints may still be available. If not, what we mentioned in regard to another member seeing this still apply. If our conclusion regarding your Henry remains correct, the receiver cover isn't aluminum. It is brass plated zinc and too thin to drill and tap for a scope mount. The receiver under the cover is made of sterner stuff and the barrel is pinned to it.

The upper two pins at the front of the receiver are tapered. They must be drifted out right to left. The pin beneath those two pins is a roll pin that also retains the

magazine tube. It also is drifted out right to left but with a roll pin punch. Once all these pins are removed, and the receiver devoid of any interference to its rear, a rubber or leather mallet can be used to drift it back and off the barrel. Quackenbush .22 Rifle Where can I get info about this rifle? How to load, shoot it, break down, etc.?

Henry Marcus Quackenbush is credited with bringing on the popularity of the air rifle in the United States. Generally speaking, his air guns were ingenious and very economical youth rifles for the manufacture of which (1893 through 1920) he designed his own mass-production machinery. Invention came natural to H. M. While working at Remington in 1902 he managed to squirrel enough time off to invent the extension stepladder. Mark Wiggins The last H. M. Quackenbush air rifle reportedly left the factory in 1940.

None of the airguns produced by H. M. should be confused with the big bore ones, up to .50 caliber, made presently by Dennis Quackenbush a distant relative of H. M. As for your gun specifically, the best source for information, parts and service is John Groenewald (jgair- J. G. wrote an entire book on the early Quackenbush rifles. By the way, H. M. even made BB ammo for his guns. Darts, too. Parker Hale I would like to find a schematic for a Parker Hale 1200 rifle and a source of spare parts.

Collin Buckingham So would we, Reader Buckingham. Such drawings might not have been in existence when Parker and Hale, both sellers of sporting arm accessories, decided to build what became one of the finest sporting long arms ever offered the public as well as an excellent tool in the able possession of a sniper. If you

are fortunate enough to be in possession of one, examine it closely for a US Patent number.

That number, a check or money order for five dollars and a written request will purchase a copy of the patent from the Patent & Trademark Office, to whom the check or order is made out, in Washington, D. C. You may also visit the United States Patent and Trademark Office online Jerry Spadorcio The patent copy you will receive will contain no schematic but it will contain many drawings and a full description of how the rifle functions.

We do know the Parker Hale action was based on the Mauser design and that Gibbs Rifle was actually involved with Parker Hale Ltd. in the past. Sears Model #101 I'm looking for disassembly/re-assembly instructions for my old Sears Model #101 single shot 20 gauge shotgun. It has a lever on the right hand side to break it open and is chambered for three inch shotshells. Also, I need the same info for my Dad's 12 gauge side by side double barrel.

It was made by Crescent Firearms Co. and sold under the name American Gun Company, serial # 114XXX with 32" Damascus barrels. Robert Gene Boehler The Sears 101 and the Stevens 940 are the same and along time out of production. We have no further information but there is a schematic of the 940 in Volume II of Jack First's catalog The Savage- Stevens Historian, John Callahan, Westfield, MA may be able to steer you to, or provide, a copy of a 940 Owners Manual.

With that in hand you could at least field strip the gun for a good cleaning. Crescent Arms produced economy shotguns for anyone who wanted

## READER FORUM CONTINUED

ORIGINAL PAGE 24

their name on them, including hardware stores. There isn't a schematic for any one of them in any of our references, only drawings of parts laid flat. Complicating things further are the Damascus barrels, which are likely to unwind under pressures generated by modern shotgun loads. We'd turn the project over to Briley Manufacturing along with an order for a couple of their full length barrel inserts. Gauge would be reduced to 16 or 20 and the gun would be safe to fire. The cost isn't on the low side.

The gun value probably doesn't warrant the expense but sentimental value may justify it in your case. Otherwise, clean it up, give the stock a good looking finish and hang the double in a place of honor over your fireplace. Verona Shotgun I have a Verona SX405S-12, semi auto shotgun in my shop that fails to feed. When the shell is released from the magazine it stops at the carrier latch, failing to push back the latch far enough to release the carrier.

All parts seem to work freely and have no apparent wear or damage. Jeffrey M Lagendyk We feel like we've been through the looking glass, and back, with this one. The Standard Catalog of Firearms lists Verona Shotguns being imported by B. C. Outdoors, a Canadian Hunting/Fishing magazine. A leading shotgun site showed Venronas being imported by PMC Ammunition. Maybe once upon a time. Not now.

Verona Shotguns made are being imported by Legacy Sports, Reno, NV assume your SX405S, for slug, arrived on these shores via Legacy. If it is new, meaning still under warranty, you can pretty much disregard what follows and return the gun to Legacy for corrective measures at low or no cost. If the gun isn't in their line, or is out of warranty, Legacy can probably supply the parts we believe might be involved.

These would start with a brand new magazine spring because the original has somehow lost "push" enough to bump the shell into the carrier release. After that,

the release itself and its related components in the carrier mechanism might be the next thing(s) to replace. The magazine follower might be involved. It could be dragging on the interior of the mag tube. If the tube is internally fouled or damaged, this could cause the drag.

The follower might be hanging up in the area of the receiver/magazine union, where the magazine discharges the shell towards the carrier mechanism. If any corrective measures must be undertaken involving the receiver, we advise the gun be returned to Legacy for service. Marlin 25M .22WMR I would like to do a trigger job on a Marlin 25M. The trigger is extremely "tight" and not conducive to good shooting. What is the best way to approach this?

I have thought of replacing the sear spring and cutting it down to a weaker point. Not cutting the spring itself but sanding the circumference of the spring making it weaker. Would this be an effective way or is there a better way to do this? Charles Knapp Charlie's Guns We're not exactly certain what you mean by "tight." Ergo, we will assume you're getting some resistance when attempting to pull the trigger but it's breaking clean after a certain amount of travel.

Before reducing the circumference of the spring, which is an inexact science, we feel safer about nipping off spring coils, removing the trigger, coating its sides with a black magic marker or indexing fluid and reinstalling it to locate where it may be scraping against the receiver or trigger guard. Relieve those areas by stoning, polish smooth and retry the trigger.

If repeated measures don't resolve the problem, remove the spring and send it to Wolff Springs, Newtown Square, PA 19073 ([gunsprings.com](http://gunsprings.com)) along with a quote on providing a couple of lighter weight, same diameter replacements. This, in our opinion, is a better way to both smooth up and lighten the pull. AG

## SEARCHABLE ISSUE RECORD

# Archive index

|                                                    |       |                                                             |       |
|----------------------------------------------------|-------|-------------------------------------------------------------|-------|
| Pittman-Robertson Act<br>American Gunsmith Editors | 2     | Revolvers And Springs<br>Robert K. Campbell                 | 16-20 |
| Savage Rascal<br>Chick Blood                       | 3-7   | Model 87 Ithaca Deerslayer Scope Mount<br>Norman E. Johnson | 21-22 |
| Crossbow Crank Cocking System<br>Norman E. Johnson | 8-11  | Reader Forum<br>American Gunsmith Editors                   | 23-24 |
| Extreme Stock Repair<br>Paul Mazan                 | 12-15 |                                                             |       |

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# American Gunsmith

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