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INSIDE THE ARCHIVE

DISASSEMBLY/REASSEMBLY OF THE STEVENS MODEL 200 RIFLE

NRA-BEEMAN TOUR A LEADER IN DIVERSITY • HEADSPACE: MEASUREMENTS AND CORRECTIONS • MAKING A LAMINAT...

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 032

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FROM THE ARCHIVE

NRA-Beeman Tour a Leader in Diversity

BY AMERICAN GUNSMITH EDITORS JULY 2006

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At a time when popular competitive sports such as auto racing, archery, golf, and swimming, are looking to diversify their participant base, one shooting-sports tour has quietly emerged as a world leader. The NRA-Beeman Grand Prix Championship for marksmen with disabilities, which is celebrating its 10th anniversary season, has achieved a level of diversity that is remarkable in many ways.

When the 12-city precision airgun tour reached this season's midway point in late April, it contained the most diverse group of marksmen in its top-ten national ranking of any shooting-sports event in the world. The extraordinary list included one Native American, two Hispanics, two African Americans, and five female competitors, which is a diversity that few sports enjoy.

It's not enough to be content with participation; newcomers to a sport must be mentored to succeed, which is what the NRA-Beeman Tour has done so very well. Dave Baskin, manager of NRA Disabled Shooting Services, first developed the NRA-Beeman Tour as a marksmanship series that would appeal to all segments of the population. To that end, certain complicated

competition rules were simplified to make the sport more accommodating and rewarding for novice marksmen with higher levels of disability.

Another key to diversification was to stage events where they would gain the greatest public exposure. NRA-Beeman events are routinely held in community recreation centers, educational institutions, rehabilitation hospitals, sporting-goods stores, and civic auditoriums, displaying the positive qualities of the shooting sports to new audiences. These convenient locations also have made it easier to obtain media coverage.

During the 2005 season, the NRA-Beeman Tour became the first shooting-sports competition in the U. S. to fully include visually impaired/blind marksmen in its events. This advancement was accomplished with an air-rifle and laser-sight combination designed by Dave Baskin and built by the Crosman Corporation. The NRA-Beeman Grand Prix Championship is proof that marksmanship events can truly be one of the most equal opportunity sporting activities in the world.

FOR MORE INFORMATION, CALL NRA DISABLED SHOOTING SERVICES AT

MACHINING

Disassembly/Reassembly of the Stevens Model 200 Rifle

Savage Arms has revived the name of a revered old acquaintance and applied it to a familiar bolt-action platform.

BY CHICK BLOOD JULY 2006

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Joshua Stevens was born in Massachusetts in 1814, when the flintlock was still the “King of the Hill” among guns. The “King” ruled until 1830, when the percussion cap dethroned it. In those days, it was customary to learn a trade by serving an extensive apprenticeship, so Stevens worked for a number of years as a machinist’s helper before being hired by Cyrus Allen, a gunmaker operating out of Springfield.

There, Stevens’ machinist skills were applied to the manufacture of percussion firearms, until the rimfire era began about 1857. By 1864, Stevens had secured a patent for his design of a single-shot rimfire tip-open pocket pistol which, when fitted with along barrel and metal frame stock, served as a rifle.

Inappropriately, since no pocket deep enough to swallow it existed, it was called the “Pocket Rifle.” More appropriately, it was better known as the “Hunter’s Pal.” Deciding to make the gun himself, Stevens established a manufacturing facility of sorts in an abandoned flour mill in Chicopee Falls, Massachusetts. By the time Harry Pope joined the J. Stevens Arms & Tool Co. as a master gunmaker in 1901, the line of tip-open actions included pistols, rifles, and shotguns.

All were single-shot including the “Stevens-Pope” Favorite, the #44 “56 Ideal, the #16 & 16-1/2 Crack Shot, and #14 & 14-1/2 Little Scout. After Stevens’ death in 1907, the dreaded (by all present-day gunsmiths) Visible Loader rifles made their debut, along with the far less troublesome Model 425 High Power lever-action. Somewhat south of Chicopee Falls a native Jamaican, Arthur Savage, had entered his rifle in the Governor’s Island Military Trials of 1890-92.

Savage held strong negative opinions regarding the shortcomings of early military magazine-fed guns, and had patented a hammerless lever-action design of his own featuring an 8-shot rotating magazine within a closed receiver. Getting his entry built was no small task. Savage had no factory, no staff, and no tooling or gauges. Still, Savage and his business partners managed a face-to-face with John Marlin in New Haven.

In spite of the Savage 1892 design losing out to the Krag-Jorgensen in the trials, Marlin remained so interested in the Savage rifle that he produced the first batch, plus all the tooling needed to make them in his own factory. These rifles were designated the Model 1895, and the tooling 223, .22-250, .243 Win, .25-06, .270, .308 Win, ’30-06, and .300 Win Mag calibers. The rifle is shown field stripped for cleaning. Basic disassembly doesn’t get any simpler than this.

DISASSEMBLY/REASSEMBLY OF THE STEVENS MODEL 200 RIFLE CONTINUED

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was shipped to Utica, New York. There Arthur Savage, by this time an American citizen, had incorporated Savage Arms and quickly developed a favorable reputation as a maker of sporting rifles with the legendary Model 1899. Through a somewhat tangled web of acquisitions and management/ownership changes over the years, Savage became the largest firearms manufacturer in the world.

Eventually, any influence left from Stevens' tip-od disappeared, and the to bolt-actions that led line, and in 1960, along came the Model 110. It remains the platform upon which all Savage highpower bolt-actions have been built ever since. Counted among them are this year's reintroduction of the Savage-Stevens relationship with the Stevens 200. Fundamentally, the design of the Shown here is the proper relationship between the baffle and the ring of the bolt handle.

A Stevens Model 200 rifle is identical to the Savage 110 with one major exception: The Stevens rifle isn't equipped with an Accu Trigger and cannot accept one at this time. We've covered both the Savage 110 and Accu Trigger in earlier issues. In case you missed the one on the rifle, I'll go over what you ought to know about the Savage 110 as it applies to the Stevens Model 200. Basic Disassembly Since it wears a synthetic stock, the Stevens has no magazine-release escutcheon, a feature present only on

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1 Safety Assembly** 1A 8-32 x 1/4" Socket Screw 1B Safety Detent Spring 1C 5-40 x 3/16" Pan Head Screw 1D Safety 2 Trigger Bracket Assembly** 2A Safety Retaining Ring 2B Trigger Pull Adjusting Screw 2C Trigger Pin 2D Safety Bearing Pin 2E Trigger Pull Adjusting Spring 2F Trigger Bracket 3 Trigger Assembly** 3A 8-32 X 3/8 Socket Screw 3B Trigger 110s with floor plates and wooden stocks.

After checking to determine that the chamber and magazine are empty, remove the stock by backing out the front (#19D) and rear (#19C) action screws. Both of these are pillar bedded in the rifle.

Open the bolt, pull the 4 Sear Assembly** 4A Sear Pin 4B Sear Spring 4C Sear 5 Magazine Box 6 Magazine Follower Assembly w/coiled spring 7 Magazine Follower Assembly w/leaf spring 11 Firing Pin Assembly** 11B Cocking Piece 11C Cocking Piece Lock Washer 11D Mainspring 11E Firing Pin Stop Nut Washer 11F Firing Pin Stop Nut 11G Firing Pin 21 Recoil Lug* 22 Barrel Lock Nut* 25 Barrel* * Factory installation only. **FFL required to purchase. trigger, and press down firmly on the bolt-release lever/cocking indicator (see photo on opposite page).

Withdraw the bolt slowly, noting how the bolt head (#12K) rides cleanly through its guide slots in the receiver. The head must be similarly aligned when reinstalling the bolt.

Stevens Model 200 Bolt-Action Centerfire Rifle (Specifications subject to change without notice) 12 Bolt Assembly** 12A Cocking Piece Pin 12B Rear Baffle Assembly 12C Bolt Handle 12D Cocking Piece Sleeve 12G Bolt Body 12H Bolt Head Retaining Pin 12I Front Baffle Washer 12J Front Baffle 12K Bolt Head** 12L Extractor 12M Extractor Spring 12N 1/8 Steel Ball 12O Ejector 12P Ejector Spring 12Q Ejector Retaining Pin 12S Bolt Assembly Screw 18 Stock Assembly 18A Swivel Stud 18B Swivel Stud (machine screw head) 18C 10-32 Lock Nut 18D Medallion 19 Trigger Guard Assembly 19A Guard 19B Rear Trigger Guard Screw 19C Rear Action Screw 19D Front Action Screw 20 Receiver* 20A 6-48 Dummy Screw 20B Safety Insert Disassembly for cleaning doesn't get any more basic than this.

Detailed Disassembly Due to the mere presence of the mainspring (#11D) always wear eye protection when taking down the bolt. Check the number stamped on the

DISASSEMBLY/REASSEMBLY OF THE STEVENS MODEL 200 RIFLE CONTINUED

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Shown are the proper configurations. bolt head against the serial number of the rifle. If they don't match, someone's pulled a switch. Every Savage rifle leaves the factory with a bolt/ barrel relationship assuring minimum headspace, and they wear the numbers to prove it. Mismatched numbers equal a mismatched bolt and barrel and all the problems associated therewith. In addition, the manufacturer will not sell bolts, reserving the fitting of new ones exclusively to its inhouse repair staff.

Okay, off with the (bolt) head. Secure the bolt body (#12G) between padded vise jaws. Remove some of the mainspring tension by using a nylon drift to push the cocking piece (#12A) forward and off its cam detent in the bolt body. Back out the boltassembly screw (#12S) with a suitable long-shank Allen wrench. Remove the bolt handle (#12C) and

rear baffle (#12B). Tilt the bolt to the rear and shake it until the cocking-piece sleeve (#12D) shows itself.

Pull the sleeve further out so the cocking piece pin (#11B) aligns with and slips into its rear cutout in the bolt body. Pull the pin out so you can do the same with parts #11C, 11D, 11E, 11F, and 11G, otherwise known as the firing-pin assembly. Use the firing pin itself to push the bolt-head retaining pin (#12H) from the body to free the front baffle (#12J), bolt head, and their friction washer (#12I).

A punch of less than 1/16 inch in diameter drifts the ejector pin (#12Q) toward its crescent-shape recess in the bolt head. Perhaps a plastic bag would be in order here. When the pin is fully removed, the ejector (#12O) and ejector spring (#12P) will make every attempt to fly away and hide. If allowed to do so, they will be most difficult to find. Begin

the disassembly of the Steven's firing mechanism by looking closely at the front end of the bracket (#2F).

The sear pin (#4A), spring (#4B), and sear (#4C) are all located inside the bolt release/cocking indicator. All these parts are retained by the sear pin, which runs through them and the receiver. You'll notice that one end of this pin is obviously larger than the other. The sear spring is located just under the pin's large end. Retain the spring and drift the pin toward that large end. Tilt the bracket down and slide it forward off the receiver.

The safety assembly (parts #1A, 1B, 1C, and 1D) will accompany it and can be lifted off as a unit. I'll return to the safety shortly. Prior to drifting out the trigger pin (#2C), pop the clip off its small-diameter end, then back off the trigger-pull adjustment screw (#2B) to lessen tension on the trigger-adjustment spring

DISASSEMBLY/REASSEMBLY OF THE STEVENS MODEL 200 RIFLE CONTINUED

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(#2E). As long as you're in the vicinity of the spring, notice how it fits under the tab on the bracket, over the roll pin at the rear of the bracket, and in the trigger-adjustment screw. So how must the spring be re-installed? Under, over, and in. Not necessarily in that order. Now back to the safety. If it functions smoothly and smartly, leave it alone. If it has a little too much vertical play, you can firm it up. Inside the safety assembly area detent sp pan-head screw, safety, and an socket screw.

Tighten this scre slightly to eliminate any slop. Checking out this corrective measure might require a few reassemblies of the trigger mechanism and will require reattaching the bracket to the receiver. It's worth the effort, however. (We never return a gun to its owner in unsafe condition.) To bring up another safety factor: A slam fire is possible due to excessive protrusion of the firing pin. Factory specification for pin-beyond-boltface is .050 inch to .062 inch.

In the Stevens Model 200, forward movement of the firing pin is under the control of its stop (see "A" in the accompanying drawing). A quarter turn of the stop adjusts the pin .0089 inch in either direction, after which the combination washer/firing-pin stop nut is turned in to secure the stop in position. Though not overly strong, if

the mainspring gives you heartburn when making protrusion adjustments, get rid of the pin temporarily.

Getting it back on doesn't call for much compression—just enough to thread on the cocking piece four or five turns. Do this as you keep the spring, the firing-pin stop nut, and its stop nut in touch with one another. Also, the Stevens' plain vanilla trigger can be adjusted somewhat for sear engagement, pull weight, safety backlash, and over-travel. You don't need stones, special files, or fixtures. All it takes is a small driver and a look at the trigger-adjustment drawing.

With the bracket and all it contains attached, the gun is cocked and locked. Key #2 in the drawing identifies the trigger-engagement screw. Turn it in until the sear releases. Back off the same screw at least half a turn to establish an absolute minimum .015inch sear/trigger clearance. Recock the rifle and check the safety for looseness. If present, adjust the safety screw (Key #3) to eliminate it. Immediately forward of the safety screw is the trigger-travel adjustment screw (Key #4).

After making this adjustment, double check that the .015 increases or lessens tension on the trigger-pull adjustment spring, but I remind you that the factory specified pull weight is a minimum of 4

pounds. In my opinion, a smooth, crisp release of the firing pin at that weight makes for a great way to put meat on the table. And a safe way. Comments on Reassembly I seriously doubt you'll encounter an old-style Model 110 sear spring in the Stevens.

The old ones incorporated a bushing and you'd be advised to radius the end of a blade screwdriver to fit the coils and use it as a "pusher" when reinstalling them. The spring on the rifle I used in preparing this article had no bushing, so I adapted a technique J. B.

Wood suggested in Gun Digest's book of disassembly/reassembly for centerfire rifles: Insert a parallel drift punch through the receiver's sear-pin hole from the left, stopping it short of passing through the cocking indicator/ bolt release to allow space for the searspring coils. Compress the spring slightly, and insert it from the rear with its legs facing forward.

A second punch is inserted from the right to lever the coils into alignment with the parallel punch, which is then pushed through the cocking indicator to capture it and the spring. In turn, the sear pin's mall end first's used to displace the parallel punch. Finally, after remounting the action, to avoid incorrect operation of the rifle, make certain there is no contact between the trigger assembly and the stock. I

MEASUREMENT & INSPECTION

Headspace: Measurements and Corrections

In a recent article, we established what headspace is and what it isn't. In this report, the author covers measuring headspace and correcting it if it's excessive or insufficient.

BY RUSSELL CORBITT JULY 2006

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A customer recently brought me a Springfield '03-A3 for testing. He watched while I stripped the bolt, cleaned the chamber, and wiped the oil off my gauges. I demonstrated the bolt stopping on the no-go gauge, and he was quite surprised. He told me that he had taken it to a gun dealer who had simply stuffed a no-go gauge into the chamber and hammered the bolt shut with a plastic mallet. I was very surprised that this treatment hadn't damaged the chamber.

After giving the customer a brief education in headspace, I don't think he'll be going back to that dealer again. In this report, I'll cover the same areas, but in somewhat greater detail. Okay, I Need to Check Headspace First, let me restate the obvious: No force should ever be used when closing an action on a headspace gauge. None. Ever. And second'also obvious'headspace cannot be measured without the proper gauge or gauges.

As I stated in my previous article ("What Is Headspace?", March 2006), factory ammunition is loaded to specified tolerances to ensure it will fit in any properly sized firearm chamber. This means it can be 0.010 inch (or more) smaller or shorter than even a minimum chamber. Since you don't know how much undersize a given factory cartridge is, it's impossible therefore to use one to obtain anything resembling an accurate measurement of chamber headspace.

An undersized chamber can result in difficult extraction or extreme pressure transients, remember? If the chamber isn't suf-

ficiently large to allow the case to release the bullet, serious problems can occur. Trying to guess how much to add to a factory cartridge to get an accurate chamber measurement is like loading your own ammo using a soup spoon to measure the powder.

In my opinion, anyone who uses or advises the use of a cartridge or cartridge case as a headspace gauge is entirely ignorant of the magnitude of damage even a small error can cause. The next important item to know is that it's nearly impossible to obtain any kind of reasonable measurement unless there is no outside force acting on the weapon's action during testing.

This means that any part of the firearm that touches the gauge when the action is closed (other than the breechface and chamber, of course) must be removed, and any action springs must come out. This means that extractors and/or ejectors will generally need to be removed from those arms that have plunger-type ejectors and spring-loaded extractors. If you can't disassemble the weapon's bolt, you can't accurately measure headspace. Take it to someone who can.

Bolts with internal plunger-type ejectors must have the ejectors removed before trying to measure headspace. Remove firing pins, striker assemblies, and other bolt internals. Semi-autos need to have their recoil springs removed before trying to check headspace. Anything touching the gauge while a measurement is being attempted will affect the accuracy of the reading.

Anything that aids or opposes action closing will absolutely ruin any chance of precision measurement.

Since we are dealing with such tiny tolerances, everything must be done to ensure an accurate measurement. This means the chamber, bolt/ breechface, ratchet/ejector (in swingout revolvers), and headspace gauge must be clean and free of any rust or foreign material. Thoroughly scrub the chamber and bolt/breechface with suitable solvents. Remove any solvent residue and check all surfaces for cleanliness. Now, we'll proceed depending upon the type of arm to be tested.

The Actual Checking Procedure Actions should always close completely (bolts locking into battery) with no resistance on ago gauge. Should you encounter resistance when closing an action on any headspace gauge, stop! Clean the chamber again, clean the gauge again, and examine everything carefully for dirt or burrs that may be interfering with the measurement. This is especially true of no-go and field measurements where you're expecting to encounter this condition.

After all, you don't want to miss along headspace condition any more than you want to "correct" a shortchamber condition only to find out you have actually caused another problem. Revolvers. Revolvers are checked in a couple of ways, depending on whether they have countersunk chambers

HEADSPACE: MEASUREMENTS AND CORRECTIONS CONTINUED

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When checking headspace on a revolver, consult the manufacturer's specs for proper tolerances; no-go measurements differ a few thousandths from make to make. This is a no-go gauge in a semi-automatic pistol. The slide is not in battery, indicating that the no-go gauge is preventing complete lockup, or not.

Those with countersunk chambers will require ago gauge to be checked properly, whereas those without countersunk chambers can be checked either with suitable gauges or by using feeler gauges to check cylinder-to-standing-breech clearance. My preferred method of testing revolvers works equally well with any revolver type. It is the

easiest and most accurate method for testing revolvers with countersunk chambers and utilizes only the go gauge.

The chamber containing the gauge is rotated under the hammer and feeler gauges are used to check the remaining clearance (Photo 1). Semi-Automatic Pistols. Semi-autos need to be checked for barrel lockup before gauging. With the slide in battery, take careful note (or a photograph) of exactly where the slide is. With a no-go gauge in a bolt-action rifle, it's okay for the bolt to begin to turn, but it should not close completely. This photo shows a no-go gauge in a Remington 740.

Note the mark on the locking lugs (1), the unmarked space showing the amount the bolt lacks to be fully in battery (2), and the

gap between the bolt and bolt carrier (3) signifying that the bolt is not fully locked and headspace is okay. aligned with some point on the frame (or how far the barrel engages in the ejection port). Then remove the extractor and recoil assembly from the slide. The gauge is chambered and the slide is gently pushed forward until it stops.

The slide/barrel should return to the exact same position with ago gauge. The slide/barrel should stop somewhere short of fully in battery with a no-go (Photo 2). Long arm testing is as varied as longgun action types. I'll detail a few here, with the idea that you can extrapolate

HEADSPACE: MEASUREMENTS AND CORRECTIONS CONTINUED

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these methods to whatever action type is on your bench. Break-Open Actions. The gauge is inserted into the chamber and the action is gently closed. The action should not latch shut on a no-go. Should the action close on a no-go gauge, it's imperative that you determine the cause of the problem before messing with the chamber dimensions, as worn hinge surfaces are very common in these action types. Rotating-Bolt Actions.

The bolt may begin to close on a no-go gauge but should not rotate into the fully-locked position (see Photo 3). On some actions (such as the Remington 74- and 76-type rifles), it may be helpful to mark the in-battery position of the bolt versus the bolt carrier or barrel extension so that a reference point is available for comparison. I use a permanent marker (or a grease pencil, also known as a "China marker") rather than scribing a mark.

Simply mark the bolt with the chamber empty, insert the gauge, then gently close the action and check for an unmarked area between the line and the bolt carrier or barrel extension. Any visi- Here's a no-go gauge in an AR-type rotary-bolt semiauto rifle. The bolt carrier will not move up flush with the upper receiver, indicating that the bolt is not completely locked in battery and headspace is acceptable. The no-go gauge is shown here in another type of rotary-bolt semi-auto rifle.

The bolt is not completely locked into its locking lug recesses, indicating that headspace is okay. ble unmarked bolt steel between the line and the reference point indicates the headspace is less than no-go (Photo 4). The bolt is not visible nor accessible in AR-type rifles, so you must observe the bolt carrier. The carrier should not move up flush with the upper receiver with a no-go in place (Photo 5). Exposed rotating-bolt actions are among the easiest to check.

This includes popular numbers like the US M1, M1A, and M1 carbine. The stripped bolt should not close fully on a no-go (Photo 6). Tipping-Bolt Actions. The bolt may begin to cam into the locking recess, but it should not go all the way into battery. A useful method for viewing tolerances here is to color the bolt's locking surface with a permanent marker or Prussian blue, then operate the bolt/carrier enough to establish a wear pattern. Then insert the gauge and observe the locking surface of the bolt.

If any shiny area is visible, the bolt is not fully locked into battery and thus headspace is less than no-go (Photo 7). What About the "Field" Gauge? Afield gauge represents the largest permissible chamber that can be safely employed with standard ammunition. The field gauge is usually used when checking military or ex-military rifles, as it is not un-

usual for military or ex-military rifles to have chambers near or slightly larger than no-go (even when new).

The most important function of a military arm is to fire on demand under adverse conditions, so they often have generous chambers to accommodate dirty, dented, or suspect ammunition. This doesn't cause a problem in military use, because military ammo generally has thicker case heads than commercial ammo. Afield gauge is employed in the same fashion as a no-go.

If a rifle's bolt will go fully into battery with afield gauge in the chamber, the rifle has very excessive headspace and should not be fired until the problem is corrected. Correcting Insufficient Headspace Conditions Revolvers with insufficient headspace can be corrected in a couple of ways, depending on whether the ratchet is part of the cylinder or a separate part. Of course, cylinder replacement is always one option, but is sometimes not feasible.

For revolvers where the ratchet is apart of the cylinder, the only option available is to turn a small amount off the back of the cylinder, leaving the ratchet untouched. With cylinders with separate ratchets you

HEADSPACE: MEASUREMENTS AND CORRECTIONS CONTINUED

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In this photo of a no-go gauge in a tipping-bolt rifle (MAS 1949-56), note the shiny area indicating headspace is acceptable. (The bolt carrier is removed for clarity.) have the option of ratchet replacement or turning the back of the cylinder (with the ratchet/extractor assembly installed) to increase the headspace to acceptable clearances. Cylinders with countersunk chambers can sometimes be corrected by re-reaming the chambers or by ratchet (or cylinder) replacement.

Semi-auto pistols will need their chamber reamed to correct dimensions or the barrel changed. Most long guns can have headspace increased by simply reaming the chamber to the proper size. Savage center-fire rifles can be adjusted as described in the next section. Correcting Excessive Headspace Conditions Should you be dealing with a poorly made firearm, the best advice I have is to tell the owner to retire the thing and replace it with something more durable.

Trying to make a silk purse from a sow's ear is the surest road I know to civil and possibly criminal liability. Excessive headspace is a common problem with these firearms. Sometimes it's due to wear and tear, sometimes to mistreatment, and sometimes to poor workmanship or improper materials used in construction. Shims are available from Brownells and Midway USA, and a swaging tool (basically a tubing cutter with a dulled wheel) can be bought from Brownells or made by the enterprising gunsmith.

Semi-auto pistols will require barrel replacement. Shotgun headspace problems due to chamber conditions (not related to worn locking surfaces or other moving parts) can

best be corrected by using tooling and rim inserts by Clymer (available from Brownells). Rifle headspace problems are corrected depending on the type of breeching system used. Most types of front-locking actions (such as Mauser-type bolt-actions, Remington boltactions, etc.) will require barrel setback or replacement.

It is possible to correct headspace in some rifles by changing bolts, but this is usually a hit-or-miss proposition. (Exception: SMLE rifles had several different sizes of bolt heads manufactured in order to allow headspace adjustment over the expected rifle life.) I've also seen rifles that have had minor corrections made by hard-chroming the bolt face to build it up, but this can only compensate for a few thousandths of error.

Savage centerfire rifles using a locking nut to retain the barrel are the easiest on which to set headspace. Lock the receiver in a receiver wrench (a Remington 700 receiver wrench will fit) and clamp the wrench in your bench vise. Loosen the lock nut with a Savage wrench and back the barrel Long headspace in a revolver that is not due to frame stretching often shows up as cylinder endshake.

This can be corrected by adjusting the cylinder's longitudinal position on its axis by the use of shims, by swaging a groove on the axis, or by replacing the off a turn or so. Remove the extractor, ejector, and firing mechanism from the bolt. Then chamber ago gauge, and shut the bolt fully. Carefully screw the barrel in until it touches the go gauge (it will stop turning).

Back the barrel off just a fraction and tighten the lock nut snug. (It doesn't need to be torqued until it squeaks.) The ideal position

is where you can "feel" the gauge in the chamber as the bolt reaches the fully locked position, but absolutely no force is necessary to close the bolt. It takes a bit of experimentation, but is fairly easy to master. Rifles that use tipping-bolt rearlocking mechanisms usually have their headspace adjusted by the expedient of changing the bolt's locking shoulder.

This is a "crossbar" in the receiver that the rear of the bolt cams down in front of. Examples include the SKS, FN49, FAL, SVT-38/40, MAS 1949 and 49-56, Ljungman, and Hakim. If a replacement shoulder is not available, it's possible to weld up the existing unit and refit it. All applicable warnings about knowing your metallurgy and heat-treating methods apply here; if you leave the shoulder too soft it will wear out quickly, and if you leave it too hard it may shatter.

Rear-locking tipping-bolt rifles can also be modified by changing or refitting their locking shoulder. Care needs to be taken when addressing these rifles. That's because it's possible to set headspace properly while simultaneously having a dangerous amount of cartridge head exposure because the chamber is physically too shallow.

It's important on these actions to ensure that the cartridge enters the chamber far enough that the front edge of its extraction groove is almost flush with the end of the chamber to guarantee sufficient support of the case head and web. Living with Excessive Headspace: It's Possible (Sometimes) Revolvers with long headspace will sometimes misfire due to insufficient primer pellet crush when struck by the firing pin. It's a major mistake to (continued on page 15)

HEADSPACE: MEASUREMENTS AND CORRECTIONS CONTINUED

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try to correct this by “improving” firing-pin protrusion through the frame, as this can result in pierced primers during cartridge setback when fired. Fix it or replace the revolver. Semi-auto pistols chambered for straight-walled cartridges can usually live with somewhat long chambers. Unless it’s a target pistol, it’s likely that no one will ever notice an excessive headspace condition on most of these pistols.

An extreme case of this condition would be when someone decides it’s a good idea to try shooting some .40 S&W ammo through a 10mm pistol. I’ve seen it done more than once, and the pistols all worked fine. According to SAAMI specs, the maximum length of a 10mm chamber is 1.004 inch, with the minimum length of a .40 S&W case being 0.840. This represents a theoretical 0.164inch excessive headspace problem!

However, as long as the round in the chamber is held in place by the pistol’s extractor, it fires and sometimes shoots reasonably well. Is this dumb? Of course; it’s never smart to intentionally chamber and fire ammo other than what the arm was manufactured to use. Shotguns with long headspace will usually misfire and little can be done to live with the condition. I recommend fixing it or retiring the shotgun. Rifles in military calibers with headspace between no-go and field can usually be safely used with military brass.

If you or your customer reload, be advised that switching from commercial to military brass will entail charge reductions of between 5 and 15 percent, because the thicker military case head reduces case capacity. My advice is to reduce charge levels to starting loads and work your way back up carefully. I have seen many folks

keep a rifle with excessive headspace in use by adjusting their reloading dies to prevent shoulder setback during resizing, thus “fitting” the case to the chamber.

This may seem acceptable on the surface, but it’s actually a very bad idea because the excessive headspace is causing abnormal case exposure in the web area in front of the head and can result in a blown case. Should this happen, you won’t like it. I’m thankful that I didn’t have one of these blowouts many years ago before I decided to gauge my Koreaner M1. Not only would the bolt close on afield gauge, the gauge would rattle in the chamber. I found a replacement barrel and fixed it. Conclusions There are a few weapons to which these rules don’t apply.

These are mainly the delayed-blowback rollerlocked designs associated with H&K. This also includes the CETME rifles and those pistols using this system, such as the CZ-52. These actions require checking a gap between the bolt carrier and the bolt head when the action is in battery. They require no disassembly or cartridge headspace gauges, just an appropriately sized feeler gauge to measure the gap. When this gap falls below manufacturer’s specifications, it means that headspace has grown too long.

It’s possible to change bolt heads and/or rollers to adjust headspace in these arms up to a point. However, these barrels will wear out just like any other. I’m thinking about an article on making your own gauges for those cartridges that are without commercially available units. This is not a job for the beginner, as it will require exacting measurements and top-flight measuring tools. It’s not impossible, however, and there are a few ways of “cheating” with existing gauges.

FINISHING

Making a Laminated Rifle Buttplate

A custom-made laminated-plastic buttplate could be the perfect final touch for that special target rifle.

BY NORMAN E. JOHNSON JULY 2006

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In making an oversize buttplate for a target stock, I decided on a unique laminated style, and it turned out to be quite a good choice. All I had to do in getting started was to round up some flat pieces of plastic in three different colors and bond them together. I wanted the finished product to have a nice aesthetic quality, so I went with black as the inner and outer layers with a solid white and a transparent green layer sandwiched inside.

The green material was 3mm thick laminated to the 2mm-thick outer black piece. The 6mm-thick white piece was then positioned next to the inner black piece. This seemed to me to be the most attractive combination. Held against the light, you can actually see light pass through the entire thickness of the translucent green material. While the pieces I had on hand would have been sufficient to construct several buttplates, I made just the one to start with.

To bond the pieces together, I used Brownells Acra-Weld 3-minute epoxy. This adhesive resin sets clear and compresses to an ultra-thin layer. The finished thickness of the part is about 13mm or about 1/2 inch. I used a C-Clamp to compress the parts after the application of the bonding agent. As the adhesive material cures, a small, flat piece of board on each side helped to keep things flat. Before rough cutting the Far The finished product is both attractive and unique.

buttplate to size, it should be temporarily attached to the stock with counterbored screws. With the buttplate in position, I marked around the stock border, then removed the plate and carefully cut outside this mark in preparation for finishing the borders. Then, with it once again screwed to the rifle, I used a sharp bastard file to form the buttplate to size and a fine 220-grit finish paper to complete the job. I also rounded off the outer edge of the buttplate using the same file and sandpaper.

I used a little Birchwood Casey True- Oil on both the stock and the buttplate to complete the job. Soft recoil pads aren't always necessary or desirable on target rifles where the buttplate is extra thick. Making your own can add a little class to the gun, as well as a measure of satisfaction. And the laminated type could be just the custom touch your customer is looking for, especially if he wishes to increase the length of the buttstock. I

MAINTENANCE & REPAIR

Fabricating Firing Pins

If you've ever tried to find replacement parts for an older firearm, you know the difficulty that's usually involved. Many times, you're money ahead to forget the search and simply make the part from scratch.

BY DENNIS A. WOOD JULY 2006

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When dealing with older firearms, consider yourself lucky if you can find a replacement part that will fit the gun you are working on to achieve correct function. Most likely, to find what you're looking for, you'll need to go to a parts broker, who "parts out" used guns and then sells the individual parts. There's no guarantee, of course, that the used part you find will work correctly in the gun you're working on.

And it's especially frustrating when the part you receive is more worn than the part you're trying to replace. If you have the original part, it can be used as a pattern for making a replacement part even if it's badly worn or broken. Or, if the part is missing entirely and you can find a replacement part from a parts broker, that part can become your starting point for making anew one which can then be fitted correctly.

Firing Pin Materials One of the most common jobs I get when working on pre-1960 firearms involves broken or lost firing pins.

Some customer's kid has taken his old gun apart, and now some of the parts have wandered off and can't be found. They usually want to know what it will take to get the gun back into working order so the kid can take it apart again. My normal response is: "Bring it in and I'll see what I can do." The most common firing pins are either in round or flat configurations.

The round-style firing pin are most common, and these are relatively easy to make. In fact, they can be so easy to make that I once pulled a firing pin out of a Remington Model 8 rifle and found that it had been made from a 16-penny steel nail. The flat-style firing pin can get quite elaborate. A good example is the firing pin found on the Remington Model 12 .22-rimfire slide-action rifle before serial number 650,000. In fact, that's the example I'll be using here.

I decided that a replacement should be made when I discovered a break on the thin outside/inner wall of the original.

This firing pin not only acts to detonate the primer, the front end of the firing pin also acts as the ejector, putting pressure on the rear face of the spent cartridge case while the extractor pulls it from the breech. (As you may know, when the Remington Model 12 transitioned into the Model 121, the breech bolt changed and around firing pin was employed.) There are a couple of readily available steels to use as base material for fabricating new firing pins.

A good tool steel, either O-1 or W-1, is easy to machine yet tough enough without having to go through a heat-treating process. La Salle fatigue-proof steel round stock is also easy to machine and makes fine firing pins, screws, and assembly pins. Some of the milder, low carbon steels will work as well, but they should have the front and rear working ends treated with "Kasenit" to add carbon to achieve a better degree of toughness. All of these steels are available from Brownells.

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Measuring And Machining After checking first to see that the chamber is empty and the magazine has been removed, we need to disassemble the firearm to the point where the bolt is removed from the receiver. Anytime you're working on a gun part that involves springs, a good pair of safety glasses should be in the correct position on your face. Remove the retaining pin that keeps the firing pin in place. Contain the spring as the retaining pin is removed, in the event it comes out quickly.

It helps to make it a habit of measuring the firing pin completely and drawing a basic outline of its shape. This doesn't need to be a fancy blueprint, just good enough to give yourself an idea of what you'll need to make. A caliper or 0-1 inch micrometer will get you through this step with very accurate results. Transfer your measured findings to the appropriate parts of your drawing. It's important to look the firing pin over for any obvious signs of wear.

Look at any of the chamfers (angled areas) to see if there is abnormal wear in these areas, which could mean there is some bat-

tering going on inside the bolt. This would indicate that this area on the firing pin is either too long or too short. Round firing pins are best turned to size in a metal lathe, but a creditable job can be done with the raw stock mounted in a drill-press chuck.

One caution here: Don't put excessive side load on the workpiece, as the chuck shank is normally held in place by means of a tapered bore. Too much side load or pressure from a file could disengage the drill chuck from its place in the spindle. Flat firing pins are best shaped in a milling machine, but here again, a drill press with a true-running chuck could also be used if you have access to an X/Y cross vise.

You'll need to take light cuts with the end-mill to prevent creating excessive side load causing the chuck shank to disengage from the quill. With some time and patience, along with a drill press and file, a very workable flat firing pin can be turned out. Using the firing pin depicted in this example, the firing-pin returnspring slot can be made by drilling a series of holes and then

using around needle file to connect the holes and get the slot into the required shape.

Using a Jig When you need to make several firing pins for the same model firearm, a jig of some sort would be very helpful for reducing setup time. I spent a couple of hours making up this jig to hold the older-style Remington Model 12 flat firing pins during the milling stages to get the firing pin into a semi-finished state. This jig is made out of aluminum so that it will not distort the workpiece as it's held during the milling operations.

The raw stock for this firing pin started as W-1 flat drill rod, 3/16 by 3/8 inch in size, cut to a length of 2-3/16 inches. This piece is then milled on both ends to clean up any irregularities from sawing and finished at a length of 2.150 inches. The final dimensions after all four sides have been milled flat and square is .150 inch thick by .320 inch wide. The firing pin blank is then clamped on its sides in the aluminum jig, which has a slot .312 inch wide by .050 inch deep milled in the middle

FABRICATING FIRING PINS CONTINUED

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between each half. A dovetailed undercut was made along each side wall of the jig to remove any radius in the bottom, lower corners. This allows the firing-pin blank to lay flat in the bottom of the jig groove. Two #8-32 screws were used to clamp the halves of the jig tightly together and hold the blank in place. In this position, the through slot for the return spring was milled in the middle of the firing pin blank with a 5/32-inch-diameter endmill to a length of .700 inch, .312 inch from the back end.

The front end of the blank was then reduced in height to a thickness of .070 inch for a length of .650 inch. A 1/8-inch ball-end mill was then used to blend the transition from the difference in height, eliminating the sharp corner between the two thicknesses by creating a 1/8-inch radius between the steps. On one outer face of the jig a pocket was milled to nest the firing pin blank at a 25-degree angle.

This pocket will hold the blank firmly so that the notch can be milled in place for the firingpin stop pin in the bolt. A little clamp was made up to hold the blank tightly against the pocket wall. Each end of this jig has had an angle milled in place. One end

has a 7-degree angle, which sits flat against the bottom face of the milling vise while being clamped in the vise jaws. Figure 1.

The firing-pin blank is mounted in the groove in the top of the fixture, this time with a small strap-clamp across the top of the blank to prevent tool pressure from pulling it out of place. With the jig in this position, the tail at the rear of the firing pin can be milled to width, depth and thickness. At the opposite end of the jig another angle was milled at 15 degrees to create the necessary angle on the end of the tail.

The tip of the tail with the 15-degree angle is designed to hit a folded-flat spring mounted in the front face of the trigger-guard frame, causing the front end of the firing pin to act as the ejector and putting pressure on the spent cartridge case allowing the extractor to pull it from the action. Keep in mind that this jig is designed to get a rough blank into a shape that will require minimal fitting, but there is still some fitting to be done.

Figure 1 shows some of the areas where the semi-finished firing- The area at "A" should be fitted to clear the rear bolt face. Adjust at "B" to get correct firing-pin protrusion.

pin blank will need attention. A nice finish can be obtained by using fourinch Swiss-pattern pillar files in the #2 and #4 cut. These files have "safe" sides, which means they have no edge teeth. Only the upper and lower faces cut; the sides are smooth and will guide the file without cutting.

For most all .22-rimfire rifles, firing-pin protrusion past the boltface should be around .035 to .040 inch. To measure how far the firing pin is protruding out the front of the bolt face, push the rear of the firing pin until the rear end meets the rear face of the bolt, and then measure the amount the tip protrudes past the front of the bolt. Adjust as necessary until you reach the required protrusion.

Conclusions Any time anew project is approached, it helps me to go over the required steps several times in my head. Thinking the project through from start to finish will usually show where any flaws exist in the plan, thus saving time and trouble later on. In this particular case, these firing pins were not that difficult to make after this careful planning, and, of course, by going slowly and measuring progress as the project went along. I

PEOPLE & COMPANIES

Working the Colt Single Action Army Model 1873

After more than 130 years of nearly continuous production, the SAA remains one of the world's most popular revolvers.

BY DAVID R. CHICOINE JULY 2006

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First introduced by Colt in 1873, nicknames associated with the legendary Single Action Army revolver include Peacemaker, Frontier Six-Shooter, Model P, and the Hog- Leg. The design was rapidly adopted by the U. S. Army and used extensively during the Indian Wars period. Colt's SAA was also used by lawmen, outlaws, cowboys, and other famous characters who helped to shape the legend of the American West. There were three manufacturing time periods for the Single Action Army or Model Pas the factory called it.

The original production, known as the First Generation, was manufactured from 1873 through 1940. This run totaled 357,859 revolvers (including the Bisley and SAA Target models). After a lull of 16 years, in 1956, the Second Generation SAA was introduced. This run continued until 1978, when engineering changes, denoted by the letters "SA" after the serial number, gave us the Third Generation SAA, which is still being produced.

During early production, the aforementioned variant called the Bisley Model was manufactured from 1894- 1915. The Bisley

used a radically different hammer, trigger, and grip shape, but was built on the basic Model P frame. Target versions of both the Bisley and the SAA, termed by collectors as the "Flattops," were also produced during the First Generation. The SAA Target was made from 1888 to 1896 and the Bisley Target from 1894 to 1913.

With its excellent action based on earlier Colt percussion revolvers, this William Mason design proved to be extremely durable. The SAA became known for reliability in critical situations, even with several parts broken or missing. Moreover, some of the Old West's more colorful and able shooters showed us that the old Peacemaker was capable of being fired with much greater speed and accuracy than might seem possible from a gun with such a crude and simple action.

The one detracting feature of the design was its slow and awkward system of loading and unloading at the rate of one shell at a time. The Colt SAA (and its modern replicas) are single-action-only, made with removable grip straps.

The SAA has been offered in many calibers such as 32/ 20, .357 Magnum, and 44/40 Winchester, but the standard and most This is an early 1875 production SAA that has been re-barreled and re-cylindere with Second Generation parts in .45 Colt. popular caliber has always been the old stand-by .45 Colt. Standard revolvers were cataloged with barrel lengths of 4, 5, and 7 inches, although in the early years the factory would supply just about any custom barrel length the buyer wanted to pay for.

The basic design remains one of the most popular and well known of all firearms. Today we have several replicas or "clones" of the SAA being imported into the U. S. from factories in Germany and Italy, along with at least one excellent American-made copy. For the most part, these copies are not as expensive as an original Colt, so they have foundawaiting market with "cowboy" shooters and Colt SAA lovers. A few of the earlier replicas earned a bad reputation for poor construc-

WORKING THE COLT SINGLE ACTION ARMY MODEL 1873 CONTINUED

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tion and parts that were prone to breakage, with some requiring the services of a skilled gunsmith before they could be used for anything. This has largely changed, and most of the modern-day copies have improved greatly in quality.

Before I go on with disassembly of the SAA, let me also recommend a few of the excellent reference books that will help you to better understand the Single Action Army's workings: *The Colt Single Action Revolvers*; *A Shop Manual, Volumes 1 & 2*, by Jerry Kuhnhausen; *Gunsmithing Guns of the Old West*, 2nd Edition, by this author; *Loading the Peacemaker*, by Dave Scovill; *Shooting Colt Single Actions*, by Mike Venturino; *Shooting Sixguns of the Old West*, by Mike Venturino; and *The NRA Firearms Assembly Book*.

You can also find some additional insight into the SAA in my articles "Picking Apart the Peacemaker, Parts 1 and 2" in the January and February 2002 issues of *American Gunsmith*. Takedown Instructions These instructions apply to Colt SAA revolvers, and generally to Italianmade Colt-type copies and clones. Unloading the Weapon. First, as always, be certain the weapon is not loaded.

Check to make sure by opening the loading gate (#23) and pulling the hammer (#27) slowly to the rear until you've heard two audible clicks. This should have placed the hammer in the half-cock or loading position,

and the cylinder (#12) should spin freely in a clockwise direction. Keep your fingers away from the trigger during this entire operation.

NOW slowly rotate the cylinder two full revolutions by hand, all the while examining the cylinder's chambers through the opening that has been presented by the opened loading gate at the rear of the frame (#20). Make absolutely certain that there are no cartridges in the cylinder chambers. Removing the Cylinder. For this operation, the hammer should be left resting in the loading or half-cocked position, and the loading gate should still be open.

The Single Action Army's cylinder rotates on apart called the base pin (#5), which must first be taken out the front of the frame before the cylinder can be removed. Colt has used two different methods to retain the base pin, and both of these are also seen on modern-made copies of the SAA.

The first type used on Colts up to about serial number 165,000 is the so-called "blackpowder-frame type." With this type, the base pin is retained by a single lock screw located at the front of the frame, just below the barrel and ahead of the trigger guard. To remove the base pin, you first have to remove this lock-screw, then the base pin can be pulled straight out from the front of the frame (#20).

The second method, called the "smokeless-frame type," uses a sliding, spring-powered crossbolt to retain the base pin. The base pin

can be removed by first depressing this cross bolt, which Colt calls the base-pin screw (#7), then by pulling the base pin straight out the front of the frame. The cylinder (#12) is now free and can be carefully rolled out sideways from the right side of the frame. Removing the Grips and Grip Strap.

When the revolver is equipped with two-piece grips, unscrew and remove the grip screw (#42) from the center of the grip, and then lift off the two grips. Some of these revolvers are equipped with a one-piece grip, in which case you will unscrew and remove the two backstrap screws (#2) from the toprear of the backstrap (#1), and remove the single butt screw (#22) from the butt of the backstrap.

The backstrap and the one-piece grip (not shown in the schematic) are loose and can be removed by pulling them down and to the rear as a unit. Once off the frame, the one-piece grip can be pulled forward and off of the backstrap. Next unscrew and remove the mainspring screw (#33) from the inside-lower area of the trigger guard (#44). The mainspring (#32) is now free to lift out.

Unscrew and remove the two rear guard screws (#34) and the front trigger-guard screw (#21), and the trigger guard (#44) will remove from the bottom of the frame. Disassembling the Action. Unscrew and remove the sear and bolt-spring screw (#37) from the underside of the frame. This is the only screw

WORKING THE COLT SINGLE ACTION ARMY MODEL 1873 CONTINUED

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Colt Single Action Army Model 1873 Revolver 1 Backstrap 2 Backstrap Screws 3 Balls 4 Barrel 5 Base Pin 6 Base Pin Bushing 7 Base Pin Screw 8 Base Pin Screw Nut 9 Base Pin Spring 10 Bolt 11 Bolt Screw 12 Cylinder inside the frame that faces straight up. The sear and bolt spring (#36) is now free to fall out the bottom of the frame. Remove the forward-most of the three screws on the left side of the frame. This is the bolt screw (#11) and it holds the bolt (#10) in place.

The bolt can now be removed from the bottom of the frame. Be sure to keep the bolt screw with the bolt while they are removed, since the trigger screw (#45) can be easily mistaken for the bolt screw, which is almost identical but slightly shorter. Next, remove the trigger screw (#45) and trigger (#43).

The hammer screw (#30) can now be unscrewed and removed, after which the hammer (#27) is rotated slightly to the 13 Ejector Head 14 Ejector Rod 15 Ejector

Spring 16 Ejector Tube 17 Ejector Tube Screw 18 Firing Pin 19 Firing Pin Rivet 20 Frame 21 Front Guard Screw 22 Front Strap Screw 23 Gate 24 Gate Catch rear, pulled down and out of the frame. The hand assembly (#31) is connected to the hammer and will come out of the frame with it.

When you have the hammer (#27) out, the hand assembly (#31) can be removed by lifting it up out of its socket hole on the left side of the hammer. Disassembling the Peripherals. The ejector-tube screw (#17) is unscrewed and removed from the front of the ejector tube (#16), allowing the entire ejector-tube assembly to be pulled to the side by its front until it moves slightly away from the barrel. At this position, the assembly can be withdrawn forward and off the barrel.

The ejector rod (#14), ejector head 25 Gate Catch Screw 26 Gate Spring 27 Hammer 28 Hammer Roll 29 Hammer Roll Pin 30 Hammer Screw 31 Hand Assembly 32 Main

Spring 33 Main Spring Screw 34 Rear Guard Screws 35 Recoil Plate 36 Sear and Bolt Spring Grips and grip screws not illustrated. (not to scale) 37 Sear and Bolt Spring Screw 38 Spring 39 Stock, Left 40 Stock, Right 41 Stock Pin 42 Stock Screw 43 Trigger 44 Trigger Guard 45 Trigger Screw 46 Washer 47 Washers, No. 8 (#13), and its spring (#15) are removed by pulling them both straight back and out of the ejector tube.

Note that on some early revolvers, you must unscrew the ejector rod (#14) from the ejector head (#13) and then remove each part separately. Under the frame, in the right-side frame rail, you'll see the gate-catch screw (#25). After removing this screw, the gate plunger (#24) and gate spring (#26) will come out through the same screw hole. The loading gate is now free to be removed by pulling it out to the front of the frame into the cylinder opening. Reassemble the revolver in the reverse order of the above. I

RIFLES

Reader Forum

BY AMERICAN GUNSMITH EDITORS JULY 2006

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Scoping the Hi-Point Carbine The January 2004 issue had an article on scoping the Hi-Point Model 995 carbine. It was a very well-written and informative article. I recently found a much simpler way of scoping the rifle utilizing the factory scopemounting system. I used an SKS-style compact scope that fits perfectly and creates no eye-relief problems. I used a Famous Maker 2-6x28 scope and Millet Weaver-style rings. This setup works great, and the compact scope on the compact carbine looks nice, too.

Sounds like a good alternative, Earl. Thanks. AMT Slam Fire A friend has a problem with an AMT .380 Backup. The firing pin broke and he took it to a gunsmith for repair. Unfortunately the pistol now slam fires when the slide is retracted and released without a finger on the trigger. Has American Gunsmith done any articles on the AMT Backup? Do you have any ideas? Thanks. We haven't done an article, but the firing pin is obviously too long. You can shorten it, being careful not to alter the contour.

Or, you can call Survival Enterprises and see if you can buy anew one. Nagant Lever Spring Replacement I'm trying to keep a simple problem simple, but need one

bit of info to finish the job (I hope). I've got a double-action Model 1985 Nagant revolver (1935 Tula Armory manufacture) in excellent condition, except that it will not cycle properly. Disassembly (with the aid of J. B.

Wood's Assembly/Disassembly book) revealed that the action was swimming in oil, and that a small leaf spring had come loose from the action and came to rest inside the left sideplate. After drying it out, it's clear that the spring belongs to the double-action lever on the hammer. Nothing appears dinged or burred, and it seems that nothing more than reassembly will be required.

That said, even Russians don't build tiny leaf springs strong enough to resist getting bugged up by going in the wrong spot' or upside down. Unfortunately, the illustrations in the book I'm using are of a singleaction revolver. Do you have a picture, schematic, or exploded drawing that might orient me on how to replace this spring? Thanks. Ray Leisner Prattville, Alabama In the October, 1995 issue, we provided a set of instructions for reassembly of the spring in question.

READER FORUM CONTINUED

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The article cautions readers that reinstalling the spring is the only hard part in getting these Nagants together, and warns that you'll probably try several times before getting it right. Those instructions state: "Put the long end of the hammer spring into its slot in the rear of the trigger just enough to slide it into place later. It must remain out far enough for the top of the spring to be forced into its slot in the bottom of the hammer under the hammer pivot pin."

This strong spring makes this hard to do, because you must keep the other end in the back of the trigger. While holding both its ends in place, you must push the spring up into both the hammer and trigger far enough for the lug pin at the bottom of the spring's "V" to be locked into place. After that, reassembly is simple. Scope-Base Mounting Tip Through necessity, I recently found a tip I thought might prove useful to others. I was restoring a cheap .22caliber bolt-action rifle.

I wanted to take the cheap, and poorly mounted iron sights off and install a scope on the gun. While it was not a highquality gun, the action was decent and the barrel was in good shape. The customer said the gun had some sentimental value, so I agreed to the restora-

tion so he could pass it on to his progeny. The rear sight was a little piece of sheet metal with a couple of screws and a ramp shoved under it. It was installed way out on the barrel and was not easy to see.

As the front sight was also screwed on, I removed both and filled the holes prior to rebluing. When it came time to install the scope base on the receiver, I didn't have a good starting point. I could determine the center of the top of the receiver, but I wanted to make sure the scope base was parallel to the bore. I came upon an idea that worked well for me. With the rifle mounted in my rifle vise, I mounted a laser level, the type you use to hang a picture on the wall, into a homemade bracket above the bench.

With the laser level aligned with the receiver center and the bore at the muzzle end, I had a nice red line to use for making the base-mounting holes on the receiver, without scratching marks and trying to use a square or some such thing to ensure alignment with the bore. The \$20 laser level turned out to be a very helpful gunsmithing tool. I know this is not a huge, innovative discovery, but sometimes simple ideas fail to occur at the right moment.

I just thought I would pass this on in case someone else might have a similar experience. Great idea, Zeke. Thanks. Stock Adjustments I'm going to cut a walnut stock into two pieces about in the middle and at a right angle to its length. The cut will be to increase drop at the heel and cast off. I will use a compound miter saw. There is no other way to do it. My questions are concerned with reattaching the two pieces. Do I use wooden dowels or metal ones? What type of glue is the best?

And do the dowel holes have to be the same size as the dowels or if the glue is stronger than the wood could I make the holes big-

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ger than the dowels so that the angles of the holes could be less precise. It's almost impossible to match the angle of the holes in two pieces of the stock so that they match perfectly. Also, I need to know what is more critical to the strength of the bond, the dowels or the matching of the flat surfaces of the two pieces? Epoxy has excellent gap-filling properties and, used properly, creates a bond that is stronger than the wood itself.

Therefore, we believe that loosely fitting hardwood dowels would be sufficient. But before firing up your saw, we suggest you read the book *Professional Stockmaking* by David Westbrook. In it, the author describes and illustrates methods of adjusting for drop at heel, cast off, toe in, and pitch without sectioning the wood. Shotgun Woes At the present time I have two firearms with similar problems: One is a S&W Model 916A 12 gauge.

When the action is pumped in a rapid manner (as when hunting) the new shell is released from the magazine, but the carrier does not lift the shell up into position for the bolt, and the bolt slides over the shell, leaving it positioned on the carrier. When cycled in a slow and deliberate manner, everything works properly. The other shotgun with a similar problem is a Remington 870 Express.

What it does is to force the shell back into the magazine far enough for the bolt to override it when the pump is cycled forward forcefully, thereby creating a jam. The gun must then be taken apart to clear the jam. Again, when cycled in a slow and deliberate manner, all works as it should. And finally, a friend purchased an old single-shot 12 gauge called a Long- Tom with a 34-inch barrel. The gun shoots well and

appears to be in excellent shape, but it patterns 12 inches below point of aim at 25 yards.

The barrel and action are tight and match up properly. I can't detect anything that would create this problem. Is there anything I can do to correct the point of impact so it will be more near line of sight? Thank you for your time. Are both the pump guns owned by the same individual? It's only a suspicion, but besides the possible need to replace some tired carrier-assembly parts in the 916, it's also possible that excess haste to get a second shot away is resulting in short stroking.

That is, failing to bring the action fully to the rear before commencing the forward, or loading, sequence. The 870 is a greater puzzle. We've never heard of one that allowed a shell to reenter the magazine after it had been introduced into the receiver. But we suppose anything is possible if one tries hard enough. Check out the carrier assembly for worn or weakened parts. Add to that the shell stops, and, again, consider the possibility of short stroking.

You didn't mention whether Long- Tom had iron sights or even a bead. If it's wearing iron, file down the front sight. If it's wearing a big bead, replace it with a really small one. You could also remove the existing sights and install along-eye-relief scope or a "holographic" sight using adjustable mounts or at least a rear mount you could shim upwards to get Tom on target. Star BM Barrel Link I have a Star BM 9mm with a broken barrel link. Parts appear to be unavailable.

The part seems simple enough to make, but I have two questions: Does the link pin drive out like any other pin with a

punch, or do I have to drill it out? And is there anything special about the metal or tempering of this part that I need to know about? Please note, I am not a gunsmith, but I am looking in that direction.

Thank you. You should not have to drill out the link pin, but we don't have the manufacturing specifications for the pistol so we cannot tell you the exact tempering factors. For anew link, or pin or both, try M&M Gunsmithing Alexandria, VA). Modernizing the Win 190 I have a Winchester Model 190 .22 LR semi-auto rifle. I thought that I would kind of bring it into the 21st century. Cost is not a factor. If you have any recommendations, please advise. We think we understand.

You want to make your 20th-century plinker at least look like it was made in the 21st century and cost is not a factor. (Those last four words are seldom to never heard by gunsmiths.) Either refinish the stock and forend or contact Mc Millan Stocks in Phoenix and see if they'll fabricate a fiberglass marvel for the rifle.

Before that, though, consider installing anew barrel. (If you decide on a heavier one, the forend won't fit because it was built to mate with the original.) Speaking of barrels, you won't find a fresh one awaiting you at Winchester so any new barrel you choose will have to be custom made. Any replacement parts you may need are likely available from Jack First, Inc. They carry components not only for the 190 but the 150, 250, 255, 270, 275, and 290 as well.

WHEN ORDERING, YOU MUST USE THE SERIAL NUMBER OF YOUR RIFLE AS SOME

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(continued from previous page) parts are unique to specific models. Since this is the 21st Century, you'll probably want a scope or electronic sights to replace the iron originals. If the receiver is grooved for rings, there's little to do but select a sight system that will clamp on. If the receiver isn't grooved, it will have to be drilled and tapped for a base. This assumes there's enough material in the receiver to make the operation feasible.

Shaky Taurus I have a bunch of problematic Taurus .357 Magnum revolvers in stainless steel brought in by a security company. All the cylinders seize when the revolvers get hot, but they work fine for the first few shots. The cylinder/ forcing-cone clearance appears nonexistent. Can you please let me know what is the optimum clearance to stone the cone to on these revolvers. Many thanks The Taurus is a first cousin to an S&W.

Normal gauge for the latter between the cylinder face and forcing cone is .004 to .006 inches. In your case, we suspect the revolvers have a cylinder endshake condition, causing them to jam up against the forcing cone at least we hope that's the problem and not a bent crane or ejector rod. You can detect those by opening the action and spinning the cylinder rapidly with two or three fingers. If it wobbles up and down, the crane and/or rod are prime suspects.

Rather than attempt to stone the forcing cone (getting it perfectly true is close to impossible free hand), purchase a revolver

chamfering tool kit from Brownells. It includes a 90-degree facing cutter for the breech of the forcing cone as well as a cutting guide for the barrel (which you don't have to remove to use the kit). Just follow the instructions and take the cone down in small increments. Check your progress frequently with a .005-inch feeler gauge.

After the gauge can be inserted between cylinder face and cone, stop cutting. Burnish the cone with the tooling supplied in the kit. Finally, remove the cylinder and install a Brownells endshake bearing to maintain clearance after the revolver is reassembled. Jammin' Mohawk 10 I have a customer's Nylon 77 (Mohawk 10) that jams consistently. It jams in three different fashions.

The cartridge-guide shelf (nylon) below the rear face of the barrel is sharp, providing a perfect place for the bullet of the cartridge on its way to the chamber to hang up. I smoothed that guide area out and seemed to have taken care of that problem. Now, it continues to jam in two ways, whether cycling by hand or firing. Much of the time, the front end of the feeding cartridge does not seem to get enough lift, and the bullet nose jams into the lower portion of the chamber mouth.

Sometimes the "cartridge pickup lug" on the bottom of the bolt barely catches the rim of the case of the top cartridge. It actually forces the base of the cartridge back down in the magazine (thus presenting the

cartridge to the oncoming bolt at a steeper angle), overriding the cartridge rim and jamming about midway up the case.

I was able to remove the magazine spring from the supplied plastic magazine and increase its tension (all this without damaging the magazine body or spring), but it didn't help the jamming problem. I'm running out of undamaged .22 LR action-proving dummy cartridges. Can you help? As you know, except for being clip-fed rather than fed through a tube, the Model 77 was a ringer internally for the Model 66. Remington's Field Service Manual for the '66 is where we looked up possible causes and cures for your problem.

If it's damaged or binding, replace or free up the cartridge stop. The cartridge-stop spring may be damaged or dislocated. Make sure it's in good shape and supports the stop and cartridge-feed insert by being positioned beneath it. You may also have a damaged or binding extractor. Free it up or replace it. Finally, the magazine follower could be fouled and the bolt override could be happening because the magazine isn't fully inserted or the magazine-catch assembly needs replacement.

Old Mossberg Parts I have a New Haven Model 295 12gauge (2-3/4 inch) made by O. F. Mossberg & Sons, Inc. of New Haven, Connecticut. I am missing the box magazine, probably two round. Can you give me any leads as to where to look? For obsolete Mossberg parts, contact Vic Havlin

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