



MAY 2008

DIGITAL ARCHIVE  
EDITION

# PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

A TECHNICAL JOURNAL OF CRAFT, REPAIR & RESTORATION

# 05

ARCHIVE ISSUE NUMBER

INSIDE THE ARCHIVE

# BASIC STOCK WORK AND FINISHIN

SO LONG, SPITZ • DISASSEMBLY AND REASSEMBLY OF THE BROWNING T-BOLT • LIMITING YOUR LIABILITY • SOLVING ...

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 053

DIGITAL ARCHIVE EDITION

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# AMERICAN GUNSMITH

DIGITAL ARCHIVE EDITION • MAY 2008

## ISSUE RECORD

|               |                             |
|---------------|-----------------------------|
| ORIGINAL DATE | May 2008                    |
| VOLUME        | Archive volume not stated   |
| ISSUE NUMBER  | 05                          |
| SOURCE ID     | ag-29556a98cf9902c4e19a907f |

## DIGITAL EDITION

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

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

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## FROM THE ARCHIVE

# So Long, Spitz

BY AMERICAN GUNSMITH EDITORS MAY 2008

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I'm not usually one to gloat over another man's misfortunes. I mean, we all make mistakes. I'm making an exception, however, in the case of former New York Governor Eliot Spitzer. You remember, I'm sure, his well-publicized exit from the governor's mansion last March over his involvement with a New-York-based prostitution ring. What you might not remember is the role Spitzer played in the nuisance lawsuits against the gun industry back when he was the New York State attorney general.

So Long, Spitz During his eight years as attorney general, Spitzer didn't compile much of a record for the successful prosecution of criminals. He did, however, compile an impressive record for persecuting legitimate businesses and for keeping his name in the headlines. In 2003, he extorted \$1.4 billion in "protection money" from Wall Street trading firms using basically the same strongarm tactics the Mafia uses on the owners of neighborhood restaurants and corner grocery stores.

And in what has to be the single greatest abuse of political power I've seen in my lifetime, he attempted to bankrupt America's leading gun-makers with the ruinous cost of the legal defense against a series of totally bogus lawsuits. He even oddly enough came down hard on New York's prostitution rings; again, without much success in putting criminals in jail, but with lots of media coverage. As you know, our legal system permits lawsuits for the redress of grievances.

But to use the taxpayer's money to sue businesses operating within the law in the hopes of bankrupting those businesses with the cost of their legal defense is an unconscionable abuse of power and the public trust. The other lawyers involved in the other 30-odd municipal lawsuits against our industry at least pretended they were suing for redress of a legitimate grievance. Mr. Spitzer didn't even pretend to have a winnable case.

His first lawsuit was dismissed in a lower court, and the dismissal was upheld by a higher court, and still he pressed on. When Ruger's management refused to sign a "vol-

untary settlement," he told them: "...bankruptcy lawyers will be knocking at your door." Spitzer was wrong, of course, and Sturm, Ruger & Co. is in fine shape today. But his high-profile bullying did succeed in one respect. Spitzer, whose friends referred to him as "Mr.

Clean," apparently never made any secret of the fact that he considered the attorney general's office to be a stepping stone to the New York governor's mansion, and he intended to parlay that job into a run for the White House in 2012. Well, he made it to the governor's mansion but I think he can forget about the White House; Mr. Clean has tripped over his you-know-what. And try as I might, I can't think of anything more appropriate to say than "na, na, na, na, na." Need Some Extra Cash?

If you would like to turn your gunsmithing ideas and expertise into cash (we pay pretty handsomely), I would like to discuss your article ideas with you. Contact me, Keith Lawrence, Editor, at: American Gunsmith, Merritt Island, FL 32954; email voice fax Editor Keith Lawrence Technical

## PEOPLE &amp; COMPANIES

# Disassembly and Reassembly Of the Browning T-Bolt

*Like the 1960s version, the new T-Bolt is a straight-pull action. Unlike the older version, the new model has at least one feature that's sure to give the gunsmith migraines.*

BY CHICK BLOOD MAY 2008

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I haven't worked with many straight-pull bolt-actions. A few Schmidt-Rubins have reached my bench, along with one Ross, which was a Canadian military centerfire that had a reputation for exploding when the bolt was assembled wrong. The sole rimfire among them was the original Browning T-Bolt. The original T-Bolt's action wasn't the smoothest; it didn't cock on closing; it was clip-fed; and it suffered from warping problems, reportedly when the wooden stocks got too close to saltwater.

The new T-Bolt, introduced in 2006, has a newly designed bolt system that cocks on closing. Its action is far smoother than that of the old T-Bolt. Other new features include an adjustable trigger system and a figure-8-shaped, double-stack 10-round magazine that snaps in neatly to all but disappear in the rifle's slim forend. It's a nice-looking package that comes in either .22 Long Rifle or .17 HMR and came out of its box with a "needs no adjustment" 3-1/2-pound trigger pull.

The T-Bolt's owner's manual warns against firing .22 Short, .22 Long, blanks, or shot shells in the T-Bolt. It also cautions against the use of strong chemicals when cleaning T-Bolts wearing certain synthetic finishes, camouflage being one. As you may know, damage done to these finishes can't be undone, so the buyer is advised to use a solution of mild detergent and water and further cautioned to avoid allowing water to settle into the action.

Regardless of these cautionary advisories, it's not unlikely that someday you'll have a blotchy-looking T-

## DISASSEMBLY AND REASSEMBLY OF THE BROWNING T-BOLT CONTINUED

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Bolt deposited with you because the owner ignored the warnings and took a can of carburetor or brake cleaner to what once was a pristine firearm. What you can do with the gun mechanically is the subject of this article. In a future article, I'll get into the options for restoring or replacing a fouled-up synthetic finish. Field Stripping Okay, the T-Bolt's chamber is empty, the magazine has been removed, and the bolt handle (#5) is in its unlocked position.

It will be canted to the rear with the crossbolt (#8) raised from the bolt body (#4). If the bolt happens to be locked instead, grasp its body in your left hand and pull the handle to the rear with your right. Slide the bolt just far enough forward to reveal the bolt release (see photo). Press the release down until it clicks, hold it down, and pull the bolt out of the receiver. Use an Allen wrench to back out the two forward mounting screws (#1).

Grasp the stock and tap the barrel down against a towel or other padding you've placed on your bench. The magazine frame (#15) may drop free. No problem. It's pretty good sized and won't get lost easily. Press down on the top of the receiver (#42) and continue to pivot the barrel upward until the action is clear of the stock. Now invert the stock. If part #15 hasn't already fallen out, lift it out. You'll see two plastic inserts under the mag frame.

One is on the recoil lug (#40); the other (#39) is at the front of the frame cutout. These are installed as part of the rifle's bedding to ensure magazine alignment. Don't remove them unless you want to create

feeding problems. Now, do you see that small sticker attached to the bottom of the receiver? Read it. When missing or meddled with, the sticker acts as a tip-off to factory repair people that someone has been messing with the trigger system.

Regardless, you're going to carefully, very carefully, peel it off so you can get to the rear stock-mounting screw. The screw won't come all the way out, but back it out as far as it will go, push the trigger guard 1/4 inch toward the muzzle, and pivot the trigger assembly off its hooks at the front of the receiver. The trigger housing cover (#43) remains attached to the receiver at this time. Depress the magazine latch (#18), and catch the magazine as it's ejected. The rifle is now field stripped.

**Detail Stripping the Bolt** You can't do anything with the bolt until you remove the firing-pin retaining band (#12A), which also retains the left and right extractors (#9 and 10) plus their spring (#11). A jeweler's screwdriver is the tool to start with. Insert it between the band and its bolt groove. Let it get trapped in there. Then take a thin but larger screwdriver, push that blade into the small gap you've made with the jeweler's blade, and twist to dislodge one side of the band from the bolt.

Chances are good the rest of the band will pop off on its own. (It's a tough piece of spring steel.) Once the band is off, you'll have a clear shot at the two extractor pins (#9A). These are roll pins. Use the correct style of punch to drive them up or down to free the extractors and their spring. Save yourself some time and trouble later by not

drifting these pins all the way out. Move the bolt handle forward to take a little pressure off the mainspring (#22).

In turn, this will allow you to move the firing pin (#12) forward enough to lift up its nose and pivot it out of the bolt. Those gear-like "teeth" on the back end of the firing pin are the sear and bolt-stop engagement surfaces. These are normally left alone, but it's okay to skillfully polish away any burr that may have been raised here. Now the baby screwdriver goes back to work. Slip it into the bolt between the crossbolt (#8) and the mainspring (#22). Compress the spring to the rear. It won't take much.

Remove the crossbolt by pushing it upward to the handle side of the bolt. (For future reference, note how the crossbolt engages the handle.) Ease off on the mainspring. With the handle positioned at the top of the bolt, move the entire mainspring assembly (#22, 23, and 24) to the front of the bolt. The ball (#25) usually remains inside the bolt pin (#6) after the assembly is moved. Press inward on the bottom of part #6 to push both the ball and the pin out, then remove the handle.

The mainspring assembly will come out the back of the bolt when it is tapped on your bench unless it's fouled inside. The Trigger Group You've temporarily stored the T-Bolt's undamaged warning label in a safe place (right?), and now you're holding the receiver/trigger mechanism in your left hand with the housing cover (#43) facing away from you. There are three long tabs extending from the

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cover that join up with three rectangular cutouts on the housing (#42). These are snap tabs. Let's get oriented. Examine the cutouts in part #42 and how the ends of the tabs from part #43 fit into them. The safety button should be to your left. One tab is forward of the button. A second is about 2- 3/4 inches further forward, near the front "hooks" of the receiver. A third is in the middle above the trigger. Each of these tabs is stressed differently to maintain pressure on the cover and keep it securely in place.

Each must be pushed in a different direction and you will likely have to resort to the jeweler's screwdriver to slightly maintain any separation between the housing and cover each time you undo a tab. If you only have one jeweler's driver, insert around toothpick in one gap before moving on to the next tab. The assembly may look like it has grown quills before you're finished.

Actually, some strips cut off an expired credit card might work even better than the toothpicks, but the important thing is to prevent the separations you create

from closing up on you. Make some notes now.

The bottom Browning T-Bolt Bolt-Action Rifle (Specifications subject to change without notice) 1 Barrel Mounting Screw (3) 2 Barrel Mount Star Washer (2) 3 Barrel 4 Bolt Body 5 Bolt Handle 6 Bolt Pin 7 Magazine Cover End 8 Crossbolt 9 Extractor, Left 9A Extractor Pin (2) 10 Extractor, Right 11 Extractor Spring 12 Firing Pin 12A Firing Pin Retaining Band 13 Gear (2) 14 Magazine Eject Spring 15 Magazine Frame 16 Magazine Frame Pin 17 Magazine Frame Spring 18 Magazine Latch 19 Magazine Screw 20 Magazine Spring 21 Magazine Stop 22 Mainspring 23 Mainspring Plunger, Front 24 Mainspring Plunger, Rear 25 Mainspring Ball 26 Receiver Pin 27 S-Mag 28 Safety Block 29 Safety Link 30 Safety, Sear, Trigger, and Sear Bar Pin 31 Safety Selector 32 Safety Spring 33 Sear 34 Sear Bar 35 Sear Spring 36 Sling Eyelet, Front 37 Sling Eyelet, Rear 38 Stock 39 Stock Plate, Front 40 Stock Plate, Rear 40A Scope Mount Filler Screws 41 Trigger 42 Trigger Housing 43 Trigger Housing Cover 44 Trigger Screw 45 Trigger Spring

## DISASSEMBLY AND REASSEMBLY OF THE BROWNING T-BOLT CONTINUED

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A B The trigger-pull adjusting screw is indicated by the arrow. It's turned counter-clockwise to lighten and clockwise to heavy up the pull. The firing pin is above the bolt handle. Note the steel ball left in the bolt handle and the shorter of the two guides remaining in the mainspring. middle tab pushes upwards. The upper tab near the hooks pushes to the left. And the tab nearest the safety pushes down. After this, the cover can be removed to reveal the T-Bolt's trigger mechanism.

Neither any part of it nor the safety is in danger of falling out. The entire system is held together by three identical pins (#30). If the rifle is brand new, all internal components will probably be thickly coated with a factory-applied lubricant. At times, this coating can be pretty thick. It's best for the gun that this layer be removed before the rifle is fired. This is accomplished by flushing away the lube with a high-quality gun oil and using compressed air to blow off any excess.

Personally, I've used an aerosol can of CLP for the initial cleanup, Right and far The plastic tabs securing the front to the back cover can be seen in both photos and must be detached as described in the text. Cfollowed that with an air blast, and I've never had problems with factoryapplied goo as a result. Having mentioned the trigger-assembly pins previously, I'll now tell you that you're not going to be doing a thing with them.

Anything'anything at all't hat goes wrong with the trigger or safety system of the T-Bolt has to be corrected by the factory. Even if I told you how to take the mechanism down and reassemble it, fixing anything that might have gone wrong would be impossible since' you guessed it'you can't get the parts. Every one of them is restricted. You can, however, purchase a complete assembly and drop it in. Finally, the Magazine Assembly Why the same restrictions do not apply with the magazine is beyond me.

For certain, the trigger and safety are far less complicated than this doublehelix bullet holder. While admitting I am not practiced in neurosurgery, I'll attempt to explain its idiosyncrasies. Please follow along on the schematic. First, note that there is an upper and a lower gear (#13) involved. The upper has an internal slot to accept the magazine spring (#20)"the only way that spring can fit into that gear. The same gear has a slot into which the straight end of the magazine stop (#21) fits.

The crooked end of the stop seats in a hole in the cover (#7). The cover is made of steel, and is held to the front of the plastic magazine body (#27)"called the "S-Mag" for some unexplained reason'by small "snap caps' on the S-Mag that bend slightly over the cover as well as by a screw (#19). When fully assembled, the gears intermesh and are under tension. (continued on page 11)

## DISASSEMBLY AND REASSEMBLY OF THE BROWNING T-BOLT CONTINUED

ORIGINAL PAGE 11

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When the screw is backed out and the snap are caps are loosened (starting with the upper left one, then the upper right, then the lower two snaps) all the internals unwind. There's no trouble at all getting the rig apart. To get it back into working order, the upper and lower gears have to be re-tensioned. Each gear has flutes like the cylinder of a revolver, with ridges between each flute.

After you get the springs back in and oriented correctly, you have to preload the magazine spring by giving the upper gear a 360degree clockwise turn. You hold it

there, install the lower gear ridge-toridge with the upper gear, give the upper gear another 180-degree turn, maintain that tension, snap the cover back on, and install the screw. Simple, right? Maybe if you have ten fingers on each of four or five hands.

Name Street City State Zip There's got to be a better way than what I described above, but nothing exists in writing on the process as of now. Actually, after spending six hours and developing a splitting headache, I did find a better way: I called Browning, ordered anew one, and snapped it into the rifle.

## MAINTENANCE &amp; REPAIR

# Limiting Your Liability

*Whether you have insurance or not, there are numerous ways to keep your personal liability to a minimum.*

BY ARTHUR J. HUNT MAY 2008

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First off, let me say that I'm not a lawyer and am not qualified to give legal advice. But I've been a gunsmith for along time and I have a few thoughts to share about the gunsmith's liability situation, what might happen, and the position you could find yourself in. Any person who repairs anything be it a gun, an automobile, or a toaster is liable in some way if the repair was of such poor quality as to increase the probability of injury. But we're talking guns here, not toasters.

Guns can malfunction, go off at the wrong time, blow up, and do any number of things that could result in a lawsuit. And guns can be just as destructive at the shooter's end as they are at the other end of the barrel. I'm not aware of any published history of the numerous lawsuits against the manufacturers of guns and ammunition or against individuals who repair or modify guns. But nobody has ever made a foolproof gun or cartridge, nor has anyone ever made such a repair.

Fortunately, most guns, ammunition, and repairs do exactly what they're supposed to do, but that doesn't mean you can't be sued by an idiot who misuses a gun. And even if you win the suit, you could still lose the farm due to the attorney's fees. So here are some thoughts on how to protect yourself and your assets: 1. The best advice I can give you is: Get some insurance. For many years, there was no national association of gunsmiths, and no simple or inexpensive way to get a liability policy.

Fortunately, that changed when the American Gunsmithing Association was founded. You can call the association h Chiarello & Co.; tell them you're an Ad

they'll give you all the info. 2. Even without insurance, there are other ways to protect yourself, and the next one on my list is incorporation. Under most circumstances, this removes your personal liability. And you don't need a lawyer to form a corporation. Any paralegal firm can do it for a hundred bucks or so. 3.

If you don't want to incorporate your business, I suppose you could put your house and everything else you own in your wife's name. That way, if you lose a lawsuit and someone tries to collect on a judgment, there's nothing for them to collect against. But you'd better have a lot of trust in your wife to go this route. 4. All of the options above can help you if you get sued, but the best way to limit your liability is to avoid doing anything that will get you sued in the first place.

And you know what I mean when I say to be careful of what you do and who you do it for. Don't agree to repair a gun that should be scrapped rather than fixed, and always be conscious of the quality of the repairs you do. Test fire every repair. And I don't mean just once or twice. Test it, and add the cost of your time and ammunition to the bill. Let's use firing-pin replacement as an example. Improper protrusion is the big thing here.

If that pin cuts through a primer and lets gas back into someone's face or burns a hand, you've got potential trouble. So check it. It would take many pages to list all the "dangerous" repairs, so I won't attempt it. Rather I'm suggesting that you examine each repair with a "what if" approach. Think about what dangers could arise if your repair fails. If you've worked on a locking sys-

tem' and there are many poor ones be sure it locks and continues to lock before you turn it loose.

One of the most dangerous designs I know of is a series of bolt-action shotguns. These guns are designed to lock the bolt closed with the bolt handle down against the forward righthand receiver. The firing pin in some cases further locks the bolt down. But these guns will fire without the bolt being fully down, and the rearward thrust can actually throw the bolt back into someone's face. They might have been cheap and popular, but I won't repair one.

I also avoid repairing old, wornout pump guns that have lost the ability to lock up tight. They might be all right with light or field loads, but there's no way to ensure that's what the customer will use. Tell your customer that the time has come to buy anew gun. Be happy with a minimum charge to examine these guns, but don't attempt to repair them. 5.

Last but not least, if you're in doubt as to the safety of any gun, have your customer sign a disclaimer. (Have a lawyer draft this.) This will provide evidence that you advised the customer that the gun, in your opinion, was unsafe to shoot. This could save you a lot of headaches later on. I hate the fact that articles like this tend to cast a dark shadow over the work we do. But liability is something we can never forget.

At the end of the day, you can listen to the advice of an old gunsmith like me who's never been in court or you can just pray a lot. And, come to think of it, it wouldn't hurt to do some of both. I

## FINISHING

# Basic Stock Work and Finishin

*With a little effort and attention to detail, stocks made of common wood can look great, and a stock made of exotic wood can look even better.*

BY BRIAN E. CAPPS MAY 2008

ORIGINAL PP. 8-13

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Recently, while walking through a gun show, I found just what I'd been looking for—a partially inletted stock for a large-ring Mauser. The wood had lots of figuring and the price was right, so I paid the man and walked away with my bargain. That's not to say things were perfect, as my purchase would require lots of sanding, the removal of several small dents, and the barrel channel wasn't even wide enough for a pencil. It was time to get to work.

**Inletting the Stock** Even though many stocks are advertised as being '95-percent inletted, I can guarantee you the last 5 percent is the toughest part. While there may be some power tools that can be used for inletting, I don't take advantage of their supposed assistance. Inletting is one area where it's easy to get carried away and remove too much wood. This is what I call an "acoustic" job.

In other words, like an acoustic guitar, you use no electricity, and you have to "play it by ear." An inletting job requires good tools

and manual dexterity, plus patience and time. And it never hurts to practice on an old stock or a scrap of wood, particularly if you are trying out anew tool. Begin by placing the action into the wood and observing how it fits. For those spots that may be a bit snug, coat the action's contact area with inletting dye or plain old black shoe polish.

When reassembled and then taken back apart, the areas that need to be addressed will have black spots on them. It's then a simple (if somewhat time-consuming) task to gingerly remove bits of wood with various chisels, gouges, files, and other inletting tools. When using wood-removal tools, go slowly and resist the urge to use a hammer to force the tool to remove more wood. Use the palm of your hand to push the cutting tip into the wood and then roll the tip outward, prying away a bit of material.

This process is continued until no more black marks can be seen. Of course, if the rifle is to be glass bedded, you'll have to re-

move additional wood to allow for the bedding compound. Sizing the Barrel Channel Barrels come in all shapes and sizes' round, octagonal, or even a little of both. Luckily for me, this one was an ordinary round barrel which allowed me to use the tools on hand to get the job done.

There are a number of techniques for enlarging a barrel channel, and most any cutting tool will work if employed properly. Some gunsmiths use a die grinder with progressively larger sanding rolls, while others might use a variety of files, chisels, and scrapers. I once let a power tool get away from me and it gouged the wood. (I'm a slow learner.), I now prefer to use tools specifically made for barrel bedding.

These cutters look like a stack of razor-sharp coins suspended between two handles and come in a variety of diameters. All that's required to en-

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Use hand pressure only—not a hammer. Large the barrel channel is to drag or push the “coins” up and down the original channel until the barrel is a perfect fit. This sounds simple—and it is—but take your time and check for proper barrel fit every few strokes. The key is to maintain downward pressure and not let the tool ride up into the side of the channel. If you do otherwise, you risk widening the upper portion of the channel and damaging the fit of barrel to the stock.

Whether you plan to glass bed the entire barrel or just ensure it floats free of contact with the stock, remove only enough material to accomplish the mission. For finishing, I use various grits of sandpaper wrapped around a wooden dowel of the proper diameter to put on the final touch. Dent Repair The tried and

true solution for a dinged-up stock was to steam the dents out by holding the damaged spots over a pot of boiling water.

A slightly more modern method called for the use of a hot iron and a dampened piece of soft cloth applied to the dented area. The boiling-water method was a hit-or-miss affair, and clumsy steam irons didn’t do much better. Now that permanent-press clothing has made the old iron practically obsolete, a different solution had to be devised to remove those dents that would otherwise ruin a fine piece of wood. The tool I use came to me thanks to a couple of my friends.

These guys are model-airplane fanatics, and spend their spare time building and flying. Early balsa-wood models were covered with a type of paper that was glued to the wings and lightly sprayed with water, which caused the paper to shrink to a perfect fit. While it did a

good job of simulating the cloth covering on real airplane wings, the paper covering was fragile and easily damaged. Some time later, a thin plastic material came on the market.

This material also needed to be shrunk to fit properly, but the shrinking process uses heat instead of water. The heat source is a handy little iron that concentrates the heat where it’s needed and can easily be held in place. Best of all, this tool is available at most hobby shops that cater to model-airplane builders and a similar item is available from Brownells. With the lightweight hobby iron, removing dents in wood is simple.

Just dampen a piece of soft cloth (I use an old white T-shirt), place it on the damaged spot, and apply the heat. The little iron’s temperature can be adjusted, and may require a bit of experimenting on your part. With

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mine, I set the control at the halfway point, which seems to work well. After the dent is raised, the newly repaired spot will require some sanding, as the grain of the wood will also rise along with the dent—which brings us to the next subject. Sanding Techniques and Tools The typical unfinished stock has numerous details that require hand sanding, and these can be attacked with some inexpensive “tools.” A small scrap of wood can serve as a hand sanding block, making sure that flat surfaces stay flat.

And different diameters of wooden dowel rods are a great way to get the contours of the rollover cheek piece to blend into each other. Just wrap the appropriate grit of paper around the dowel, hold it in place with your fingers, and smooth out the rough spots.

Next time you’re at the home supply store, ask if they have any short scrap portions or buy a few different sizes; these rods can

serve a multitude of purposes in your shop. (I turned a piece of 3/4-inch dowel into a holder for rolls of emery cloth.) Speaking of abrasive products, it’s wise to stock up on a variety of grits. Starting the job requires 100 or 120 grit, and several more grades will be needed as the job progresses, up to and including 600.

And don’t buy the Tool & Material Sources Most of the tools and materials men is available from Brownells. The Brownells part number is the following: Item Part No.

Inletting Block 457-001-050AA Palm Chisel Set 615-100-006AA Barrel Bedding Tool Set 364-700-000AA Stock Iron 875-100-002AA Art’s Gun Stock Filler 464-101-000AA Tung Oil 586-501-016AA Boiled Linseed Oil 083-040-016AA The Ryobi Detail Sander (DS1000) and the Black & Decker Mouse sander are available from online retailers or most hardware and home centers. cheap poor-quality sandpaper.

It may seem like a bargain, but it will lose its grit quickly and will load up with sand particles, requiring you to get a fresh sheet much more frequently than with the more expensive stuff. A good sanding job can help make an ordinary stock into a much nicer one. All it takes is time and elbow grease, although the need for either can be reduced greatly with sanders powered by air or electricity.

If you have an air compressor, an automotive body sander (often called a “jitterbug”) is a great help in quickly sculpting the gunstock. By starting with a coarse grit and sanding with the grain, the major wood removal goes quickly. If no compressed air is available, an electric automotive sander will do, but they’re generally heavier and more cumbersome. There are some excellent smaller units that are sized perfectly for working on gunstocks.

One I like is the Ryobi DS1000 detail sander and another is the extremely versatile Black & Decker Mouse. I say the Mouse is versatile because it comes with a number of attachments that make the small jobs easier. Also, the sandpaper can be changed to a fresh sheet or different grit very quickly, because the paper is held in place by a Velcro-like material. It also has gel padding in strategic locations, meaning you can sand for long periods of time without your hand going numb.

Of course, electric and airpowered sanders are best used for the initial stages of the work, and can do damage if you aren't paying attention. Final sanding should always be done by hand and checked frequently. Rub your bare hand over the entire stock to detect rough spots or areas that require more work. The final step before staining and finishing is to raise the wood grain by moistening the stock with water and allowing it to dry.

A quick check will reveal wood that looks like it has several day's growth of beard. A fine grade of paper will remove these "whiskers." Repeat the process as many times as needed. Most stocks require one or two times depending on the species of wood, and some will require this process to be repeated as many as four or five. Finally, the Finish Just like a fancy paint job on a car, the prep work makes all the difference in the finished product.

Now that we have the surface of the stock smoothed to perfection, it's time to fill the wood and select a stain. It is indeed rare to find a piece of wood with few open pores, and fancier woods often seem to require more filling. There are a variety of fillers, some that already are mixed with stain. My personal favorite for better grades of wood is Art's Gun Stock Filler in French red. This stuff really brings out the figuring in wood and makes fancy stocks just that much nicer.

Art's also makes a clear filler, as do several other companies, when you want to use your own stain. This open-grain wood filler is easy to apply. I use the cheapest brushes available (buy a bag at the hardware store for a few bucks) and paint it on liberally across the grain. When nearly dry, wipe off the excess (again, across the grain) and set the stock aside to dry. If you use clear filler, the stain must be applied before the filler material.

**FROM THE ORIGINAL PAGE**

If you want to get creative, stains can be blended to achieve a whole new spectrum of color. Glass jars (from baby food or pickles, etc.) are great for mixing and storing stains, simple to label with a felt-tip marker, and make it possible to see the color. Wipe on your favorite stain and allow several minutes for the color to seep into the wood. The longer the stain stays, the deeper the color. And, if the final

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result isn't to your liking, most hardware stores carry wood bleach. If necessary, you can bleach the wood and start the staining process over. Once the color is to your liking, the final finish can be selected. There are various spray-on finishes that supposedly mimic a genuine hand-rubbed finish. I much prefer the real thing, however. If you want to do it my way, begin by mixing equal quantities of tung oil and boiled linseed oil. Apply the oil with wet-or-dry sandpaper.

I start with 320 grit dipped in the oil, and sand in small circles until the entire stock is done. Set it aside for 15 minutes and then wipe off the excess oil against the grain using a paper towel. This process is filling the final few spots on the stock to achieve a custom finish. Think it's not needed? Apply one coat, allow to dry

overnight, and hold it up to the light. You'll see numerous tiny fissures in the wood that don't show when the grain is properly filled.

Repeat the sanding-with-oil process several times, concluding with two coats using 600-grit paper. Once the oil is dry, I put a small amount of the oil mixture on my hand and rub it into the wood. This is the crowning touch that will make all your efforts worthwhile. The finished product will be stunning. Conclusions There are no secrets to doing fine woodworking. It just takes time, effort, and attention to detail.

With that, even poorer grades of wood can be made to look attractive, and fine wood can rival anything made by the masters in merry olde England.

## RIFLES

# Solving Extraction, Ejection, and Feeding Problems on the Marlin 39A

*Here'by popular demand'are the most common problems with one of America's favorite .22 lever-action rifles, along with tips on how to resolve them.*

BY CHICK BLOOD MAY 2008

ORIGINAL PP. 14-17

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As you probably know, the Marlin 39 Series goes back a bundle of years. It was Marlin's first lever-action .22 capable of interchangeably feeding Short, Long, or Long Rifle ammo and was designed by L. L. Hepburn. Originally introduced as the Model 1891, it developed into the takedown Model 1892 (another Hepburn patent #584177) and further evolved into the Model 1897, which reportedly was Annie Oakley's favorite .22.

The '97 remained in production until 1915, when a syndicate intent on making machine guns for World War I acquired Marlin (Marlin-Rockwell). After peace arrived in Europe, what had been the original sporting-arms branch of Marlin was taken over by John Moran, who wisely decided to leave machine guns behind and just as wisely kept his name off the new company he formed, The Marlin Firearms Corporation. The first Model 39 appeared in Marlin's 1922 catalog.

If you find a copy of the catalog in a library or purchase a copy of Colonel William Brophy's great book on the history of

Marlin Firearms'and I believe every gunsmith should have one'a careful reading of page 269 will reveal that the Model 39 was actually designed by Marlin-Rockwell before the Moran deal went through. Any examples of the rifle stamped "Marlin-Rockwell" are exceedingly rare, and will bring a premium price from a collector.

What I'll refer to temporarily as the Marlin-Rockwell Model 39 was identical to the octagonal-barrel Model 1897, and was in production from 1922 until 1936. It was replaced in 1939 by the Model 39A. (The suggested retail price at the time was \$29.75.) Among other improvements, the 39A was equipped with anew ejector that rid the rifle of the single ejector spring in the Model 39, and the new 39A could digest high-velocity rounds.

This is a good time to to pass on a few words of caution: If you ever get a Model 39 in for service that does not have "HS" stamped in front of its serial number, be on the lookout for a cracked bolt. This hap-

pens all too often because of a horizontal cut located at the bottom of the bolt that weakened it.

A subsequent change in machining practice eliminated the offending cut, but high-velocity .22 ammo should never be used in any Model 39 that lacks the "HS." After dozens of cosmetic changes, commemorative issues, and the introduction of the Micro-Groove barrel in 1954, the 39-Series passed the 2,000,000 manufactured mark in 1984, and the 39A remains in production today.

As this is written, Marlin has no intention of discontinuing it, so you never know when a Marlin Model 39A might be carried through your shop's door. Takedown and Field Stripping If you haven't already noticed, I am departing somewhat from my usual disassembly/reassembly format for this article. Instead, I'm concentrat- Many owners of the rifle ignore or overlook the precleaning instructions printed in the owner's manual, thus causing one of the most frequent complaints gunsmiths are asked to resolve.

## SOLVING EXTRACTION, EJECTION, AND FEEDING PROBLEMS ON THE MARLIN 39A CONTINUED

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ing on troubleshooting and repairs. The reason for this is the large number of readers who have requested troubleshooting help on this model. And besides, all the takedown information you need already exists in at least two other places. One of those is The NRA Guide to Firearms Assembly; the other is Gun Digest's Book of Disassembly for Rimfire Rifles. I will, however, mention something about field stripping.

All the instructions I've seen state that the takedown screw can be backed out with a quarter and doesn't come out all the way. The fact that it doesn't come all the way out is universally true. But saying that it can be loosened with a coin between your fingers makes the process sound easy, and that "ain't necessarily so" with factory-fresh rifles; the Marlin assemblers turn that screw in nice and tight. A rifle that has been dismantled a few times and shot a bit may not have a tight-screw problem.

To keep the field stripping easy, always back off the takedown screw one-eighth of a turn after you reassemble the gun. Another thing: After the takedown screw is loosened, the disassembly instructions might tell you to strike the buttstock with the heel of your hand to separate the two halves of the receiver. A better way is the way a Bfactory service manager told me to do it.

That is to place a folded towel on your workbench, take a firm hold on the buttstock, and then gently and repeatedly tap the left side of the barrel aft of the front sight on the padding. Make It Clean Marlin issued an advisory awhile back that should be religiously followed. The company says the rifle should never be cleaned without first depressing the ejector with a small tool, holding it down, and locking it there with a turn of the rivet immediately forward of the ejector.

The rivet can be turned with a small screwdriver. Unfortunately, this advisory isn't always followed and results in two of the most frequent complaints regarding malfunctions. You'll understand what they are and what happens to cause them later on. I've been told that 90 percent of the Model 39A rifles that are returned to the factory for service arrive there filthy. This is due partly to the nature of the .22, but is primarily the result of owner neglect or the use of the cheapest ammunition the owner can find.

In any case, here's a little "secret" that will cure the vast majority of malfunctions that plague the Marlin Model 39A: Clean it thoroughly. Extraction and Ejection Problems But what if the problem is more than just an accumulation of dirt? There's no more appropriate place to start than with the number-one complaint—extraction

problems. And by that I mean extraction problems that persist after the rifle has been cleaned and its chamber has been polished.

Working with magnification, see if the extractor (#23) is flush with or (preferably) slightly below its slot in the bolt (#2). It's supposed to be, and no matter how hard the owner insists that "nobody's taken this gun apart," don't believe it. The extractor/bolt relationship being correct, the extractor itself maybe out of gauge. Proper gauge is determined with feeler gauges, with the chamber empty and the bolt closed. If a .0290-inch gauge fits under the extractor, the gap is too wide.

When a .0260-inch gauge fits snugly under the extractor, all is in order. An out-of-gauge extractor can be bent to conform, but don't use heat to do so. After extraction come ejection problems. Fired and unfired .22 rounds can and do become stuck in the chamber if it's rough, fouled, or enlarged. There's a right way and a wrong way to remove them. The right way is to open the bolt, raise the cartridge guide (#13), insert the tip of a pocket knife or a dental pick under the rim, and pull the blockage clear.

Literally hundreds of Model 39A owners persist in using another method. They open the bolt, insert a rod at

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the muzzle, and push. Sometimes they break off the rod, which can leave an unpleasant surprise in the barrel for you or a factory repair technician to discover. Or sometimes they push too hard, and the end of the rod enters the receiver with enough force to break the ejector (#18) or bend the cartridge guide. Sometimes both are damaged. Without exception, in a Model 39A, nothing can lead to ejection problems quicker than a banged-up or loose ejector. Loose ones can be retightened with their screws (#20).

A damaged ejector should be replaced in part or in total. Feeding Problems While the haphazard use of a rod to dislodge a stuck shell more often affects ejection, it can also cause feeding problems by knocking the cartridge guide out of adjustment. I usually pull an on-range test to check for the possibility of a bent guide by cycling through a few live rounds without discharging them. Then I examine the noses of the bullets.

If I discover a dent or a scuff on either their upper or lower surface, I assume the guide is out of adjustment. What then? Remove

the guide, deburr it with a wire wheel, and polish it. Reinstall the guide and tighten its screw (#14) securely. The guide has to be fastened tightly for the next step to take place. If the bullet indicates marring at the top, bend the guide down so its upper end is flush with the top of the chamber.

If the bullet is stubbing low, bend the guide upward until its upper end is dead centered with the chamber. After making any guide adjustments, don't fail to loosen the guide screw. If you forget to back it off, the guide won't work because it can't move. Rarely, a bent finger lever (#24) can cause feeding problems by throw- A lever passing this tap exam might still be bent at one of three or four critical angles. Data on these and their exact location in the lever is not available from Marlin.

A replacement lever fresh from the factory will most assuredly be correct. If you have one or order one, you can measure the bent lever angle against the lever you know isn't bent, and then adjust the bent one to match. (Again, no high heat, please.) But don't get me wrong here; reforming a bent lever without the factory jig made for the

purpose (which is not available to gunsmiths) is no cinch. If that discourages you from trying, install a lever and either toss the old one or send it to Marlin to be straightened.

There's a final cause of feeding problems, but this one is extremely rare: That's a broken or weakened spring inside the inner magazine tube. If the cartridges fail to reach the cartridge guide, they're hanging up in the tube. Replace the spring and they won't anymore. Misfires Misfires area common complaint with the Model 39A. In fact, misfires in general are more common with rimfire ammo than with factory-produced ing off the timing of the carrier (#8).

A clue that the lever is bent is if it has too much vertical play with the action completely closed. A verification that the lever is bent comes from placing the suspect on a true surface'a square of 1/ 4-inch plate glass is ideal'and seeing if it wobbles in any direction by tapping it with a fingertip at each end and at several points along its outer edges.

## SOLVING EXTRACTION, EJECTION, AND FEEDING PROBLEMS ON THE MARLIN 39A CONTINUED

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The ejector's retaining-screw heads are located on the right side of the receiver. centerfire ammunition. In the 39A, misfires are usually traced to a breech that's too heavy or too loose. Further defined, too heavy means too little headspace and too loose indicates excessive headspace. And, believe me, it's much, much easier to correct too loose than too heavy. You'll need .22 caliber go and nogo gauges, a smooth-cut file, and some polishing compound.

Depending on the task at hand, you'll also need shim stock, a TIG welder, or solder, cyanoacrylate glue, and glue solvent. For checking headspace, prepare yourself to perform repeated assemblies and disassemblies of the receiver halves so the bolt can be activated and locked in battery with the finger lever. As you'll see, the bolt wears a radius on its right front end.

When too much headspace is the problem, that radius can be carefully filed down, then polished until the go gauge affirms the condition has been corrected. Correcting tight headspace de- If not flush, the upper side of the extractor should be installed slightly below the top of the bolt to avoid malfunctions. mands greater skill, more care, and

more time. That's because the radius must be built up, properly contoured, and polished until the go gauge tells you to quit.

This build-up can come from applying metal with a TIG welder or applying a shim strip with silversolder. The strip might offer some advantage over a naked weld, because it will tend to conform to the radius. The aforementioned glue can be used to hold the shim in place as long as you also have the appropriate solvent on hand to completely clear off the adhesive from all surfaces prior to soldering. And remember, no heat is to be applied to secure a permanent bond until after the bolt has been totally stripped.

Whether you have to work the bolt down or build it up, it must maintain the original contour of the radius when you're finished. There are other causes for misfires. Fortunately, none are anywhere near as tedious to fix as headspace. One is a broken or bent firing pin (#28). Bending can shorten a pin. A shorter pin can cause light hits on the rim and no ignition of the primer compound. Check the pin for straightness on a true surface. Bent pins can be straightened. Broken ones must be replaced.

How did this pin get bent or broken? In all likelihood, the rifle's owner, that same guy who assured you no one had taken the gun apart, didn't tell you the truth. In the denied takedown or reassembly process, the perpetrator could have bent the Marlin's hammer-spring adjusting plate (#39), thereby lessening its tension and causing light hits. It's as likely the perp nipped a coil or two off the spring (#38) and compounded the possibility in an amateurish attempt to improve trigger pull. Replace both components.

Some problems related to a bent lever don't cause misfires, but a crooked lever can cause roughness in the action. I've already gone through what you can do about bent levers. And Finally, The Most Common Complaint The single most common problem I hear about with the Marlin Model 39A'the one I get most emails about and the most calls to the Technical Hotline'is a loose lever. Fortunately, in this case, the cure is simple: Tighten the lever screw (#25) and replace the spring (#26). All repairs should be so easy. I

## PISTOLS

# Working the S&W .32 Double-Action Top-Break Models

*The .32 DA and its big brother, the .38 DA, were forerunners to what we know today as the “modern” S&W revolver. Hundreds of thousands of both were produced and sold around the turn of the last century.*

BY DAVID R. CHICOINE MAY 2008

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In the last issue, we looked at Smith & Wesson's top-break .38 Double Action, which was the forerunner to the “modern” S&W revolver. Introduced in 1880, the fact that over 550,000 were produced testifies to the popularity of the .38 DA. Introduced at the same time, Smith & Wesson's pocket-sized version, the .32 Double Action, was only slightly less popular, with 327,641 revolvers manufactured in a continuous production run between 1880 and 1919.

As we did last month with the .38, in this issue we'll look at the changes that took place in the top-break .32 Double Action as it evolved from the 1st Model (1880) to the 5th Model (1909). Then we'll take one of these revolvers apart and see what makes it tick. Like the .32 Single Action, introduced two years earlier, the .32 Double Action was built on what was then called the Model 1-1/2 frame size, and also like the SA, the DA offered simultaneous, automatic cartridge extraction.

The .32 Double Action was also chambered for the same caliber, .32 Smith & Wesson, that the company had introduced two years earlier with the Single Action, and both revolvers had five-shot cylinders. As its name would indicate, this revolver was double action, but it also had single-action capability. The hammer used a half-cock or safety position, and there was a separate sear in between the hammer and trigger used specifically for the half-cock and single-action functions.

Smith & Wesson was constantly perfecting this popular design, and five separate engineering changes occurred during the .38 DA's period of manufacture. Those changes form the five distinct Models or types which we have outlined below. The 1st Model used a distinctive straight-sided sideplate, the design of which was found to have weakened the frame.

As a result, on the 2nd Model, which followed very quickly, and on all subsequent models, the sideplate was an irregular shape that allowed more material to remain

on the left side of the frame. Both the 1st and 2nd Models made use of an unusual rocker-type cylinder stop, with a separate fixed stop on the trigger. This required a double set of stop notches in the cylinder, as well as a free cut for the fixed stop.

In turn, this dictated very short cylinder flutes. The .32 Double Action was manufactured from 1880 to 1919 and proved to be a popular backup revolver. The revolver shown here is a 4th Model, which, in my opinion, produced a rather peculiar and unattractive-looking cylinder. Subsequent models, the 3rd through the 5th, used a leaf-type cylinder stop which allowed the use of conventional stop notches and thus longer, more attractive cylinder flutes. Here are the particulars on the five different models: 1st Model.

Manufactured in 1880, with serial numbers from 1 to 30. Features include a sideplate with straight-sides, a rocker-type cylinder stop, short cylinder flutes with double stop notches and free cuts, are-

## WORKING THE S&amp;W .32 DOUBLE-ACTION TOP-BREAK MODELS CONTINUED

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verse-curved trigger-guard bow, and a front sight pinned into the barrel. It was produced in a 3-inch barrel only. 2nd Model. This model was made from 1880 to 1882, with serial numbers from 31 to 22,172. It features an irregular-shaped sideplate, a rockertype cylinder stop, short cylinder flutes with double stop notches and free cuts on the cylinder, a reversecurved trigger-guard bow, and a pinned front sight. Made with a 3inch barrel only. 3rd Model.

Produced in 1882 and 1883, the 3rd Model has serial numbers from 22,173 to 43,405. This model features a leaf-spring-type cylinder stop, a cylinder with conventional flutes, a single set of stop notches, a reverse-curved trigger-guard bow, and a front sight pinned into the barrel. It came in 3-, 3-1/2-, and 6-inch barrel lengths. 4th Model. Made from 1883 to 1909, with serial numbers from 43,406 to around 283,000 (the exact transitional number from the 4th to the 5th Model is not known).

Features include a leaf-spring-type cylinder stop, a cylinder with conventional flutes and a single set of stop notches, a rounded trigger-guard bow, and a pinned-in front sight. This model was available with a 3-, 3-1/2, 6-, 8-, or 10inch barrel. 5th Model.

Produced from 1909 to 1919, the 5th Model has serial numbers ranging from about 283,000 to 327,641.

This final version has a leafspring-type cylinder stop, conventional cylinder flutes, a single set of stop notches, a rounded trigger-guard bow, and a front sight that's forged as one piece with the barrel. The S&W name and address are stamped on the barrel rib, but patent markings are absent. This model came in 3-, 3-1/2-, and 6inch barrel lengths. The illustration and photos used here are of a .32 Double Action, 4th Model. .32 D.

A. 3rd and 5th Models are nearly identical, while the 1st and 2nd Models differ externally as noted above and internally as will be noted in the disassembly instructions that follow. Disassembly Instructions 1. As always, check first to be sure you're working with an unloaded gun. Hold the revolver firmly by its grip, keeping your fingers away from the trigger and the barrel muzzle pointed in a safe direction.

Pull back the hammer slightly until you hear one click; this should place the hammer in the half-cock position. Using your other hand, pull up on the barrel catch

(#42) and allow the barrel to tilt all the way down to open the action. Doing this will expose the rear of the cylinder (#37). Check to be sure the cylinder is unloaded. If cartridges are present, remove them now and place them in a separate location away from the work area. 2. Next, we'll remove the cylinder.

While holding the barrel catch in the up position, pull the cylinder toward the rear and at the same time turn the cylinder in a counter-clockwise direction. This will allow the cylinder to be withdrawn toward the rear and off the base pin (#40.) Disassembly tip: Damaged screw heads are the sure sign the gun has been in the hands of an untalented amateur. It will also help the fit of the screwdriver blade in the screw slot if you take the time to go into the screw slots with a dental pick and clean them out. 3.

Now we can remove the barrel (#33). First, unscrew and remove the joint-pivot screw (#52a) from the left side of the frame hinge. Again, use a small dental pick to scrape out any accumulated grease, dirt, and rust from the screw slot before attempting to remove the screw. And use the right size screwdriver blade for the screw

## WORKING THE S&amp;W .32 DOUBLE-ACTION TOP-BREAK MODELS CONTINUED

ORIGINAL PAGE 20

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32 DA is shown with its barrel removed from the frame and disassembled. you are removing to avoid damage to the screw head. Using an appropriate sized straight punch, drive out the joint pivot (#52) toward the right side and out of the frame. Notice the witness mark on the joint pivot as well as its corresponding witness mark on the frame. These must be aligned for correct reassembly later. The barrel is now free and can be lifted up and out of its joint with the frame.

Note the extractor cam (#41) which is located up in between the ears of the barrel hinge. You can now pull this assembly down and out of the hinge. Stop here and make note of the extractor cam's correct position for reassembly. 4. To remove the Smith & Wesson's grips and sideplate, unscrew and remove the stock (grip) screw (#49) and lift off the stocks (#47 and 48).

If the grips don't come off easily after removing the screw, try carefully slipping the edge of a singleedged razor blade between the grip and the frame's omewhere down near the butt. Carefully work the blade in between the metal and the grip until you can twist the blade slightly 32 DA is shown here with its trigger guard and trigger spring removed. The next step before hammer removal is to drive out the pin that holds the rear sear spring and remove the spring. and gently lift the grip away from the gun.

Unscrew and remove the hammerstud nut (#55) located in the center of the sideplate (#39). The hammer stud nut acts as the sideplate screw. Turn the frame over on its side and hold onto it by the hinge, with the sideplate facing up over a well padded surface. Using a plastic or hardwood mallet, hit the grip frame a sharp blow or two. This will

cause the sideplate to be shocked and jump up out of its seat in the frame so it can be lifted out.

As you've heard me say before, never attempt to pry off a sideplate, as permanent damage to the sideplate and frame can occur. Using a pair of spreader-type pliers between the rear of the mainspring and the inside of the grip frame, compress the top of the mainspring (#60) to a point where the hammer stirrup (#56) can be rotated forward and out of its seat between the ears at the top of the mainspring.

Loosen the strain screw (#50) located in the bottom-front of the front grip strap on the frame to relieve all tension on the mainspring, and then remove the mainspring from the side of the grip frame.

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Rocker-Type Cylinder Stop (1st and 2nd Models) Smith & Wesson .32 Double Action Top-Break Revolver 33 Barrel 34 Frame 35 Trigger Guard 36 Rear Sear 37 Cylinder 38 Front Sight 39 Sideplate 40 Base Pin 41 Extractor Cam 42 Barrel Catch 43 Hammer 44 Trigger 5. Now remove the trigger guard and trigger spring. The trigger guard (#35) is itself a spring and is under tension. There are no fastening screws; the guard is held in place by machined tabs at its front and rear which mate with machined mortise cuts in the frame.

As a spring, it spreads out naturally, pushing the tabs into the 45 Extractor Rod 46 Extractor 47 Grip 48 Grip 49 Grip Screw 50 Strain Screw 51 Barrel Catch Screw 52 Joint Pivot 52a Joint Pivot Screw 53 Hammer Stud frame slots. Holding the frame upside down by the grip, tap the rear-lower face of the triggerguard with a plastic or hardwood mallet, this will cause the rear tab of the trigger guard to pop out of the seat in the frame.

Now pull the trigger to the rear and the trigger guard will slide rearward enough to disengage its front tab from the frame. 64 Hand Spring 65 Barrel Catch Cam Spring 66 Trigger Spring 67 Rear Sear Spring 67a Trigger or Sear Pin 67b Stop Plunger (1st & 2nd Mdl.) 67c Stop Spring (1st & 2nd Mdl.) 67d Cylinder Stop (1st & 2nd Mdl.) 67e Stop Pin (1st & 2nd Model) 54 Extractor Stud 55 Hammer Stud Nut 56 Stirrup 58 Barrel Catch Cam 59 Extractor Spring 60 Mainspring 61 Front Sear 62 Hand 63 Cyl.

Stop (3rd - 5th Model) 67f Stirrup Pin 67g Sear Spring Pin Continue by tilting the front of the guard down and pushing forward to remove it completely. The Smith & Wesson's trigger spring (#66) is now free and can be lifted out of the frame located just forward of the trigger. Be sure you take note of its position on the trigger for later reassembly. "

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6. Disassembly of the action on 3rd, 4th, and 5th Models requires a small pin punch and hammer to drive out the retaining pin (#67g) for the rear sear spring (#67). Once that's done, lift the trigger to the rear. You mer (#43) up and off its hammer stud (#53) and then out of the frame. At this point, as you release the trigger, make note of the rear sear (#36). Using a cup-tipped pin punch and hammer, drive out the rear sear pin (#67a). This pin is the rear-most of the two large pins that pass through the frame.

Once the pin is out, remove the rear sear, making note of its position for reassembly. Once again, use a cup-tipped pin punch and hammer to drift out the trigger pin. This pin (also designated #67a) is the forward-most of the two large pins passing through the frame. Push the trigger assembly up and slightly toward the rear, just enough so that the entire face of the hand (#62) is exposed in the sideplate opening.

Grasp the hand, along with its spring (#64), using a small pair of needle-nosed pliers and pull the assembly straight up and out of the frame. The trigger is now free and can be removed out through the bottom of the frame. The front sear (#61) is also free, and can be removed through the sideplate opening. For 1st and 2nd Models, disassembly is similar, but the trigger is also equipped with a pivoting cylinder stop, spring, and plunger, which become exposed once the trigger is removed (see Step 7 below).

Be sure to make careful note of the relationship of the trigger assembly (#44, #61, and #62) for reassembly later. This is a good time to point out that, before driving pins, in order to prevent damaging or breaking the part in which the pin is installed, it's a good practice to provide support to the part by positioning it on a bench block and driving the pin into a hole in the block. 7. On 1st and 2nd Models, the cylinder stop (#67d) is mounted in the top-center of the trigger.

Under the cylinder stop, there's a small plunger and coil spring which provide upward tension to the stop. This spring and plunger will be under tension during trigger removal, so use care when removing the trigger to ensure these two tiny parts don't get lost. On the 3rd through 5th Models, the cylinder stop (#63) is held to the frame by across pin (#67e) and the stop can be removed by first carefully drifting out this pin. 8.

To disassemble the cylinder, insert five fired cartridge cases into the chambers to support the extractor shaft. Grab the extractor rod (#45) by the head in the jaws of a drill chuck, then rotate the cylinder in a counter-clockwise direction to unscrew the extractor rod from the extractor (#46.) Take note of the witness mark (dot) on one of the rear-facing legs of the extractor star. This mark should align with the serial numbers on the cylinder for correct reassembly.

To prevent damage to the extractor spring during reassembly, grab the front portion (about 1/4 inch) of the extractor rod by its

head in the jaws of a drill chuck. Then assemble the extractor spring onto the extractor rod and place the cylinder with the extractor over the rear end of the rod. Push the cylinder forward, in this way compressing the extractor spring as much as possible, while turning the cylinder in a clockwise direction until the threads have started by about half a turn.

Stop turning about every half-turn and allow the extractor to return by spring tension, then push the cylinder in again to recompress the spring. Continue tightening by one-half-turn increments until you have the rod tight. 9. Removing the barrel is done by unscrewing and removing the barrel-catch screw (#51) from the left side of the barrel top-strap. The barrel catch (#42) is now free to be withdrawn out the rear.

Now hold the barrel (#33) in a muzzle-up position and tap the rear of the top-strap on a wooden block or bench top. The barrel-catch cam (#58) and barrel-catch cam spring (#65) should fall out of their recess in the barrel top-strap. Be sure to make note of their positions for correct reassembly. The front sight on all except 5th Models is pinned in place in the barrel rib by a tiny cross pin. After driving out the pin, the sight can be held with parallel-jaw pliers and then pulled straight up out of the barrel.

That completes the disassembly of the Smith & Wesson. 32 Double Action. Reassembly of the revolver is accomplished by simply reversing the order of the steps above. I

## MAINTENANCE &amp; REPAIR

## Reader Forum

BY AMERICAN GUNSMITH EDITORS MAY 2008

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**R**emington Front Sight Replacement I just joined the American Gunsmithing Association and I appreciate your offer of technical assistance. Where can I find information and diagrams to show how to remove and replace the front sight bead (not a threaded type bead) on a Remington 870 Express shotgun? I hope you can help. Thank you. Recent Model 870 shotguns have been equipped with a pressed-in front bead. If you're familiar with a hardware store tool called a tack puller, buy one.

If you can't find one, you can make a tack puller by putting a slight upward bend in the blade of a screwdriver and then grinding or filing a V-groove in it. The V-groove should span the neck of your front bead but not its ball. Then harden the modified blade with Kasenit (from Brownells).

Next you'll want to duct tape a wooden pad to the barrel or rib about an inch behind the existing bead. (If the bead is rib-mounted, a small C-clamp with protected contact surfaces should be mounted on the muzzle side of the rib to prevent it from being lifted off the barrel.) Now, using the wooden block as a fulcrum, insert the pulling tool under the ball and pry upward to remove it.

When installing the new bead, support the barrel with a wooden dowel or a brass or aluminum rod before tapping the new bead down into place. If no rib is present, be certain the new bead doesn't intrude into the bore. If it does, carefully file, stone, and polish the stem of the bead to blend smoothly with the bore. Winchester Model

1400 Mag Tube Removal I would appreciate any assistance you can give on safely removing the magazine tube from the receiver of a Winchester Model 1400 shotgun. Thank you.

It seems like we get this same question every few months, so listen up, guys and gals. The Model 1400 magazine tube is pressed into and held in the receiver by one or two tube throats. A back-up tube cap must be screwed on the end of the tube to drive it into the receiver with a wooden, plastic, or leather mallet. That, of course, is after the trigger assembly, forend/action bars, bolt, and the components of the recoil/gas system have been removed.

The tube only has to be driven inward far enough to free the throat(s), which will drop from the bottom of the receiver. Then remove the backup cap, slip a slide hammer over the tube, and replace the back-up cap. The slide hammer must move freely between the receiver and the cap. It can be a piece of iron pipe, a bored out 1-pound weight from a set of NRA trigger pull weights, or something as simple as a box-end wrench to which additional weight is taped.

With the back-up cap screwed back on (hand tight is okay), the replacement throat(s) are positioned on that portion of the tube projecting into the receiver, and the tube is pulled forward by hand to capture them. The slide hammer is then repeatedly moved back and forth to impact the back-up cap until the throat is (or the throats are) flush with the inside of the re-

ceiver. Finally, replace the back-up cap with the original cap. Reassemble the shotgun, and check the function with dummy rounds.

Troubleshooting Marlin 39A? Somewhere in your magazine I know I read an article on troubleshooting the Marlin Model 39A. But I have all the issues and can't find it. Could you please tell me which issue it's in? Thank you for your time. The bad news is: You're wrong; There is no article on troubleshooting Marlin 39A in any of our back issues. The good news is, thanks to your request and several others, there is just what you were looking for in the issue you have in your hands. You're welcome.

Cracked Barrel A customer brought in a Remington Model 512A tube-fed .22 rifle with the bolt out. He couldn't get it back in. The bolt was uncocked. I cocked the bolt and it went back in partway, but pulling the trigger still wouldn't let bolt go all the way in. Part of the carrier seems to stick up too high in the bolt tunnel. I removed some rust with steel wool to find the model number and a crack about 1-1/4 inches long showed up about 2 inches past the end of the forend.

If I get the bolt back in, how dangerous might this be to the customer (or anyone around him). The crack on the barrel is about as wide as the line drawn by a ball-point pen or maybe a little wider. Thanks. Assuming the crack extends into the bore, we believe the gun would be dangerous to shoot and the owner

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(continued from previous page) probably wouldn't hit anything with it anyway. Besides a new barrel, it sounds like the carrier assembly is in need of an overhaul. Adjustable M77 Trigger I recently purchased an aftermarket drop-in trigger for the Ruger All-Weather Mark II M77 (from Brownells). There was more work involved to make it drop in than I was led to believe, so I sold it. My question to you is: Who's got the least complicated adjustable trigger for this model? Thanks. We don't understand your question.

The Ruger Mark II Target is built on the standard Mark II action, but has a fully adjustable trigger (see the May 98 issue). Instead of digging around in the aftermarket, why not call Ruger and get a Mark II target-trigger assembly for your Model 77? Erma-Werke Receiver? Could you help me identify a .22-caliber lever-action I recently acquired? I can't find any information except what's on the gun. Here's what is on it: Erma-Werke, Model EG 73, Kal .22 WMN.

It also says: Serial # 003796, Made in West Germany, Excam, Inc., Hialeah, Florida. I need a replacement receiver and a beaded insert for the front sight. The one on the gun has been broken and someone tried to repair it by spotwelding it. It didn't work!

The gun seems like a good design, but Numrich does not list any parts for it. An exploded view would also be good. Thanks for any help you may be able to give me. All importation of Excam guns ended in 1990.

Your rifle was discontinued in 1985 and was chambered for .22 WMR only. No schematic can be found. The EG 73 was a small-caliber copy of the Winchester Model 1892, which was a center fire rifle. Unfortunately, there's no way a receiver from the Model 1892 if you could find one will fit your gun. Your best bet is to contact Brownells and ask for a free copy of their parts source list for out-of-production firearms. There's a possibility you might find a source for a receiver or front sight on that list.

Fox in a Basket I know it's not a Fox Model B, but a customer brought me a nice old Philadelphia 20-gauge Fox shotgun. The problem is it's totally apart. He had the action recolored and the barrels blackened, and now he can't get it back together. I've searched through my library and online, but have failed to find anything.

I don't expect to find detailed instructions on assembly, but a diagram with parts would be a big help. I really don't even know if all of the parts are there. Can you help me or tell me where to look for infor-

mation? If the shotgun was made in Philadelphia by A. H. Fox, that happened between 1905 and 1930. The Model B, by the way, wasn't introduced until 1942, some 12 years after Savage acquired Fox. In any case, if there is a patent number anywhere on the shotgun, a copy of the patent can be obtained from the U.

S. Patent & Trademark Office, Washington, DC, for a very nominal fee. If no patent number is shown, a patent search would have to be conducted at considerably greater cost. A patent contains several drawings and a description of how the gun operates, and would be of great help to you if that's all the information you can find. Before you pay for a patent search, we suggest you contact John T. Callahan, the Savage historian Westfield, MA 01085).

Include a photo of the shotgun, gauge, barrel length, any and all markings/ numbers it carries, and a stamped, self-addressed return envelope. Mr. Callahan may be able to give you the patent number. His services are not free, but would be far less than hiring a lawyer to conduct a patent search. One concern remains with us: Your customer has greatly lessened the collector value of the gun by having it refinished. Some of the old Fox doubles are in the five-figure category.

## SEARCHABLE ISSUE RECORD

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