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AND THE AMERICAN GUNSMITH ARCHIVE

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INSIDE THE ARCHIVE

WORKING THE S&W TOP-BREAK .38 SINGLE ACTION, 2ND AND 3RD MODELS

SHOOTING FOR THE FUTURE • DISASSEMBLY AND REASSEMBLY OF THE SMITH & WESSON I-BOLT RIFLE • SOLVING COM...

ORIGINAL METHODS. MODERN ACCESS.

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FROM THE ARCHIVE

Shooting for the Future

BY AMERICAN GUNSMITH EDITORS JUNE 2008

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I know I don't need to tell you how much the future of our business depends on a continual influx of new shooters, hunters, and firearms owners. Over the years, many different programs have been implemented in an effort to accomplish this. Among the best of these programs is the First Shots® program originated and administered by the National Shooting Sports Foundation (NSSF).

This year, thanks to this program, nearly 100 shooting ranges across the country will provide local residents with the opportunity to take their "first shots" with a handgun, rifle, or shotgun. Further support for the program comes from many firearm-industry firms and shooting-sports organizations.

Sponsors provide much-needed loaner firearms, training and safety literature, information on shooting and hunting opportunities, and promotional items. "I see First Shots as very important to building long-term growth for the industry," said Adam Wollander, vice president of sales and marketing with Crimson Trace, a maker of grip-integrated lasersighting systems.

Numerous other shooting-sports businesses contribute to the effort, along with arms makers Marlin, Smith & Wesson, Ruger, and Taurus. "All of these companies and

organizations have stepped up to make sure that first-time shooters have a first-rate experience," said Cyndi Dalena, NSSF's First Shots manager. "Their assistance plays a key role in First Shots' success.

The program's recent expansion to include rifles and shotguns means even more industry companies can be involved with this targeted effort to reach anew audience and build new customers. First Shots is hosted by independent shooting facilities, providing newcomers with a welcoming introduction to shooting at their local ranges. The seminars cover firearm safety, local ownership requirements, shooting fundamentals, hands-on instruction, as well as details on how and where to continue with the sport.

NSSF deserves our thanks and congratulations for increasing awareness of and participation in the shooting sports. For more information on NSSF, visit or look for more about this program in particular at 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@gunsmithmag.com; fax Editor Keith Lawrence Technical

METALWORKING

Disassembly and Reassembly of the Smith & Wesson i-Bolt Rifle

After a few experiments with offshore production, the handgun giant is building this premium long gun right here in the U. S.

BY CHICK BLOOD JUNE 2008

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It seems the reports on the demise of “Gun Valley, USA” have been greatly exaggerated. Case in point: The new Smith & Wesson i-Bolt Rifle, which was designed by S&W engineers in Springfield, Massachusetts, and is being manufactured in that American facility. The public got its first glimpse of the new rifle during the NRA Meetings and Exhibits in 2007.

Unlike many firearms which are not available for sale until long after their initial introduction, the i-Bolt actually began showing up in gun shops during the summer of the same year. Initial calibers were .25-06, .270, and .30-06. Magazine capacity is four plus one.

When I asked what the “i” ini-Bolt stood for, the initial response was a single word: “innovation.” When I asked what “innovation” meant, I got an earful and then some. “Innovation,” according to the Smith & Wesson engineers includes a “breakthrough” in bolt releases (the patent is pending). The bolt is withdrawn with a simple lift, push, and pull. No buttons to press, no levers to swing open, and no other mechanical parts involved.

The triple-lug bolt assembly itself boasts a short, 60-degree travel, a flat-top handle, and a cocking indicator at its rear. Another innovative feature of the firecontrol system is its S&W-designed three-position safety. With its

lever to the rear, the gun is ready to fire. In the middle position’s something not usually found in arc-movement safeties’ the rifle can be loaded or the bolt can be removed. When the safety is forward, the rifle will not fire.

To further the goal of providing hunters and shooters with one of the most accurate, reliable production Top of page: The new i-Bolt Rifle was designed in the U. S. by Smith & Wesson and is being manufactured domestically. The “i” ini-Bolt stands for “innovation.” It dispenses with a bolt-release mechanism, carries a 23-inch match barrel, and has a trigger that’s owner adjustable without disassembling the rifle.

DISASSEMBLY AND REASSEMBLY OF THE SMITH & WESSON I-BOLT RIFLE CONTINUED

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bolt-actions available, S&W reached out to a couple of the company's subsidiaries well known and highly respected in the firearms industry. One of these is Timney Manufacturing, Inc., whose engineers worked closely with the team in Springfield to design the Tru-Set' trigger (also patent pending). The trigger housing is machined from a single piece of steel. Its cross pins are press fitted. Moving them (not advised) would require an arbor press.

In fact, taking out any one of those pins, or the larger, easily removed safety-lever pivot would totally disrupt, dislodge, and let loose everything inside the housing. Another potentially serious consequence to attempting such an action is: No data is available on re-assembly. What the owner gets right out of the box is a rifle with a trigger that can be adjusted from 3 to 6 pounds without removing the barreled action from the stock.

It's essentially "field adjustable" using a small tool that's included with the rifle. The tool has its own little slot in the foam padding inside the hard case that accompanies each rifle leaving the factory. As you may know if you read the trade press or The Wall Street Journal, The tool fits within the trigger guard to make field adjustments possible. Turning clockwise increases the pull, counter clockwise lightens it.

The front pin is identified by the "A" in the photo and the adjustment screw is at "B." The assembly can be replaced as a unit, but cannot be further dismantled. Smith & Wesson is also the parent company of Thompson/Center Arms, Inc. Thompson/Center is one of the world's largest manufacturers of premium hunting rifles, so why not get them involved with the i-Bolt? So it was reasoned, and so it happened.

The i-Bolt rifle features a 23-inch freefloated match-grade T/C barrel with a 1-in-10 twist and a 90-degree target crown. Atop the polished blue metal is a one-piece Weaver scope mount wearing a unique recoil lug. This lug helps secure the mount to the front of the ejection port, thus stabilizing the scope when the rifle recoils and avoiding interference with exiting brass. The Monte Carlo-style stock is of a rigid synthetic polymer, and boasts its own list of innovations.

Simply explained, there are four small "Xquadrants" molded inside the forend to strengthen and stabilize it. It's called X-Bed' technology. Again, the patent is pending. And don't look for sling swivels that protrude from the stock. They've been molded in as indents. The final feature waiting for a patent to come through is a recoil-reduction chamber in the buttstock. Into it goes a recoil tamer, either the one offered A B

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1 Receiver 2 Recoil Lug 3 Barrel 4 Trigger Guard 5 Floorplate Latch 6 Floorplate by S&W or an aftermarket unit of the owner's choice that fits the chamber. It's claimed felt recoil can thereby be reduced by approximately 30 percent. (The final figure depends on what's filling the recoil reduction chamber.) In my opinion, the "innovation" in the i-Bolt Rifle is no idle boast. It's a simple statement of fact.

Field Stripping Okay, the gun is empty, your eyes are protected, and your fingers are outside the trigger guard. A few paragraphs back I mentioned that you lift, push, and pull when removing the bolt. Here's how that works.

Place the Smith & Wesson i-Bolt Bolt-Action Rifle (Specifications subject to change without notice) 7 Trigger Housing Pin 7A Floorplate Pin 8 Mag Latch Pin 9 Mag Latch Spring 10 Front Trigger Guard Screw 11 Rear Trigger Guard Screw 12 Stock 13 Trigger Assembly 14 Magazine Spring 15 Magazine Follower 16 Scope Mount Screw 17 Scope Mount safety in its center (loading) position. (There is no bolt release, remember?) Now lift the bolt handle and draw it fully to the rear.

Push the bolt approximately 1/2 inch forward, apply a slight downward pressure, and rotate the bolt handle down until it almost touches the stock. You may have to wiggle the bolt slightly to align all the slots and relief cuts before gently pulling the bolt from the receiver. Now you can push the release lever inside the trigger guard. The floorplate will fall open with its spring still attached. If it doesn't fall free on its own, extract the magazine box (#29) or "tube," as the factory calls it.

Next remove the front guard screw 18 Ejector 19 Ejector Spring 20 Ejector Pin 21 Extractor 22 Extractor Plunger 23 Extractor Spring 24 Bolt Body Assembly 25 Striker 26 Striker Spring 27 Cocking Piece 28 Shroud 29 Magazine Tube (#10) and the rear guard screw (#11), and separate the action from the stock. Note how the scope mount (#17) has been relieved in its center portion to clear the ejection port. The trigger assembly (#13) will remain attached to the barreled action.

Incidentally, if you leave the magazine assembly in the rifle while backing out the guard screws, the mag spring (#14) is strong enough to raise the guard clear of the stock the second the screw threads exit their holes in the receiver and tang. Detailed Stripping All the pins mentioned here (#7, #8, and #20) are roll pins. Use only a

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properly sized roll-pin punch to move them. Where possible, drift a pin just enough to free up the part it retains. This will make reinstallation easier and reduce the possibility of damaging the pin. Secure the bolt upside down between padded vise jaws by its shroud (#28) with the bolt face toward you. Pause and study the cocking piece (#27). There's a flat on its bottom. Push upward on the cocking piece to relieve the tension on the striker spring (#26).

Either keep pushing upward as you rotate the bolt body (#24) or stop and push upward after each complete rotation. It will take three 360-degree turns to back out the shroud. There's a "collar" near the business end of the striker (#25). You can't miss it. It has a larger diameter than the rest of the component. That collar has to be rotated 90 degrees to detach the striker from the cocking piece. Remove the shroud from your vise and clamp the bolt body between those same padded jaws.

The body should be secured about 2 inches behind the bolt face and should be facing you. You can see the plunger (#22) immediately behind the extractor. Aft of the plunger is the extractor spring (#23), but it's hidden inside the bolt head. Cover the ends of your needle-nose pliers with a small strip of duct tape, grab the end of the extractor, and then tilt the pliers toward At both times, the bolt head faces the gunsmith. The nose of the cocking piece (arrow) must engage the bottom of the bolt channel as shown.

I you to free the extractor from the bolt and remove it. Be careful; the plunger and spring may want to fly off to parts unknown. The ejector (#18) is located on the opposite side of the bolt face from the extractor. On the lug immediately above the ejector is a pin hole. The other end of the hole can be seen once the extractor is removed. Depress the ejector to the point where it's flush with the bolt face. The pin can be drifted upward or down.

Either way, once it has cleared the ejector, the ejector spring (#19) will start to push it toward you. You'll feel the pressure. Ease out the part and keep its spring under control. Note: There's a slight countersink associated with the pin which is intended to make reinstallation easier. It's not necessary, however, to drift the pin out completely when removing the ejector.

With the guard assembly in your hand, the magazine tube out of the receiver, and the floor plate (#6) open, you'll see two tabs on the floor plate that keep the magazine spring (14) attached to it. Separating the spring from the plate is a simple matter, after which you can disassemble the plate latch (#5). You should be aware of and watch out for the latch spring (#9) when you drift out the latch pin (#8). This spring is very small and is not attached to anything.

It's merely seated in a shallow hole in the trigger guard. All that's keeping it there is the inside upper edge of the latch. When the pin is taken out, the latch will drop

away. And if you're not careful, you'll be hunting for the spring for hours. Reassembly Tips My first tip concerns the ejector. For reassembly, insert the spring, depress the spring with the ejector, and be sure the concave machined cut in the ejector aligns with the pin hole. Then install the pin.

As you noted when you took out the extractor, there's a recess for it milled in the bolt head. You might not have considered this significant during disassembly, but the back end of the extractor is rounded and has two steps. When you insert the spring and plunger, the front end of the plunger has to sit on the higher of the two steps.

You'll know you've done things right when the rounded part of the extractor locates behind the plunger nose, the plunger snaps into the extractor, and the rounded end of the extractor does likewise with the bolt. The bolt will give you less trouble if you secure the shroud upside down in the vise. Then reinstall the cocking piece in the shroud.

Slide the striker and its spring into the cocking piece, and compress the spring enough that you can lock the striker/spring assembly into the cocking piece with a 90degree turn. Screw the shroud assembly into the bolt body until it's hand tight, and make certain the nose of the cocking piece ends up fully engaged with its notch at the back end of the bolt's bottom channel. And that should do it.

MAINTENANCE & REPAIR

Solving Common Problems With .22 Rimfire Handguns

To a greater extent than with centerfire guns, problems with rimfire handguns are often found to be ammo-related and usually relatively simple to repair.

BY ROBERT K. CAMPBELL JUNE 2008

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It's a safe bet that pistolsmiths who do general repair work see .22 rimfire handguns in the shop on a regular basis, since there are probably more .22s around than any other caliber. The quality of these handguns runs the gamut from pot-metal cheapos to as fine as any handguns made. Still, the .22 rimfire handgun is typically less expensive than a centerfire handgun, and materials and workmanship are often not up to the same standards as the more expensive pistols.

That, plus the availability of cheap ammo often translates into work for the gunsmith. Before looking at the problems encountered with rimfire handguns, we should look at the cartridge. The .22 rimfire is the last survivor of the old inside-primed rimfire type. In Top 22-caliber rimfire cartridge itself can cause more problems than automatic-pistol cartridges like the .45 ACP. Bottom 22 snubby, but this little Taurus DA revolver is among the best of the breed.

It's still subject to the problems associated with .22 rimfire ammo—especially if it's dry fired. In addition to the .22, these cartridges once included rimfire .25-, .32-, .38-, and even .44-caliber versions. The priming compound is in the soft rim of the cartridge. It doesn't matter where on the rim the firing pin strikes; the priming compound will ignite the powder charge. The bullet is soft lead and “heel based.” In other words, the bullet features a heel that is less than bullet diameter.

This heel butts into the cartridge case and holds the bullet in place. The .22 Magnum is an exception as this cartridge uses a modern jacketed bullet that is crimped in place, but the procedures described in this article also apply to the .22 Magnum. The .22 rimfire cartridge is more susceptible to damage than a centerfire cartridge.

The bullet can be pushed to an angle during the firing cycle, and contamination of the powder charge or damage to the case is more common with the .22 rimfire than with centerfire cartridges. Merely achieving feed reliability in an automatic action is something of an accomplishment with a rimmed case, though our major gunmakers have done well in this regard. When the .22 cartridge is chambered, the chamber acts to control headspace as well as to give a solid surface for the firing pin to strike the case rim.

Two things happen that are problematic with the .22 rimfire and each revolves around this chamber design. Over a period of time, the force of the firing pin damages the chamber in an automatic or chambers in the revolver. This happens more frequently with inexpensive handguns, but no make is immune. The soft metal is damaged. Sometimes a nick in the cylinder face protrudes

SOLVING COMMON PROBLEMS WITH .22 RIMFIRE HANDGUNS CONTINUED

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into the chamber and causes a problem in chambering. Dry firing often exacerbates this problem. Firing-pin protrusion is set on some of the better automatics so that the firing pin does not connect with the chamber, but almost all revolvers will nick the chamber if dry fired. Some of the aluminum slide conversion units could be ruined by dry fire. The simplest rule of thumb is: No .22 should ever be dry fired.

As you know, the firing pin of a centerfire handgun will simply strike air if there is no cartridge chambered, but it can be assumed that the .22 rimfire firing pin will strike the chamber. Even dry firing with empty or on-cased cases is not a good practice, as the cases are thin and soft and provide little protection against wear or damage to the chamber mouth.

Regardless of whether the damage is a result of dry firing or normal wear, nicks and scrapes from the firing pin on the chamber mouth are ruinous to ignition. Needle files (sometimes called jeweler's files) can be used to remove nicks and burrs and straighten the chamber, while a smooth stone will dress up the filed section. Never enlarge the chamber; the burr is usually just at the mouth of the chamber. There is also the matter of headspace.

You can't remove so much metal that there is insufficient bracing for the firing pin to crack the primer. You are filing or polishing exactly where the firing pin contacts. Hopefully the area is raised and you only need to dress the area down a bit. Interestingly, at least one revolver maker has adopted an advanced chamber design. The North American Arms Mini Revolvers have

a cylinder that, rather than enclosing the cartridge case head completely, has one side of the cylinder open.

While a recessed cylinder is a safety feature, the topstrap is a sufficient safety feature to contain the gas of an unlikely case rupture. The minuscule North American Arms revolvers are of very high quality and, should it ever be necessary, the cylinders will be much easier to file and dress up. The slide or breechblock face of semi-automatic pistols can become deformed, sometimes by firing only a few thousands of rounds, particularly with aluminum-slide pistols and the less expensive foreign pistols.

Even revolvers are sometimes seen with such problems. Just the same the handgun usually continues to work just fine. The breechface sometimes picks up a sharp edge that simply needs to be dressed down and polished. Occasionally, the firing-pin hole will become deformed, sometimes to the point where the firing pin actually sticks. In this case, the smallest needle files can be used to clean up around the firing-pin channel without altering the channel.

The old Star and Beretta small-frame .22s are neat little guns, but the Star in particular will show this trait in hard use. Small burrs caused by a firing-pin strike can usually be cleaned up with a jeweler's file. At the other end of the spectrum from the beating-up-the-chamber problem is the problem of light firing-pin strikes. Sometimes a worn firing pin must be replaced and other times the problem is even simpler than that. Recently, I purchased an older High Standard Sentinel .22 for a song.

It functioned just fine in single-action fire but sometimes misfired in double-action fire. The firing-pin indent was very light. I

wondered if someone had lightened the hammer spring. In this case, a few decades of accumulated crud had built up in the action and varnished the parts. A liberal dose of Outers Crud Cutter did most of the work, and oily gum literally ran out of the action. After a good scrubbing, the piece worked perfectly without the need for any replacement parts.

This brings us to the problem of over-lubrication. Occasionally, a centerfire handgun will be found that works just fine practically dry. This is rarely the case with a .22. Most .22 pistols and conversion units demand proper lubrication and simply will not function without it. But while they need lubrication, it's possible to have too much of a good thing. Excessively thick lubrication will slow the slide down on automatics and will collect unburned powder in the revolver.

Keep in mind that the .22-caliber cartridge is capable of producing only so much energy, so while the slide needs lubrication, you don't want to slow it down with too much lubricant. In addition to the problems caused by a rimmed cartridge that we discussed earlier, this 150-year-old cartridge design suffers from another inherent problem. The .22 cartridge is "outside lubricated." A more modern revolver cartridge's meaning anything designed since about 1899 has lubricant in the lube grooves at the base of the bullet.

This base is enclosed in the cartridge case. The bullet in the .22 case is outside lubricated, meaning the whole bullet is covered in a lubricant to help prevent leading of the gun barrel. This lubricant is so efficient that .22s rarely suffer from leading, but the lubricant tends to

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.22-caliber revolver such as the Taurus double action. To do so will most often result in at least a partial loss of reliability. While the ammunition could be the cause, a rough breechface may have contributed to the problem. combine with oil and unburned powder to produce “gumming.” I have seen a pistol go from perfectly clean and lubricated to jamming within 100 rounds. The only real cure is disassembly and a complete cleaning.

This residue tends to gum up and harden”“varnishing” is the term that’s sometimes used. Gun Scrubber and Crud Cutter are fine for initial cleaning, but removing this buildup often requires some abrasion from an old toothbrush or a nylon cleaning brush. Once cleaned and reassembled, the pistol is then lightly oiled. The .22-caliber semi-automatics are often described as “finicky eaters” by some, but I don’t really find this to be true.

The Ruger and Browning automatics, the Ceiner conversions, and even my little Walther PPK/S are all very reliable as long as they’re fed high-velocity ammunition (and properly lubricated). I also don’t pay much attention to those who say that high-velocity ammunition will batter a .22 pistol. The difference between standard-velocity and high-velocity ammo is not that great—only about 130 fps’ and there isn’t much reserve of energy for these pistol to function.

If gun owners would learn to keep their .22s clean and keep them lubricated, we’d lose most of our business in rimfire handguns. With .22 automatics, when double feeds or other feeding problems occur, the problem is almost always related to the magazine. With the 1911, magazines are often replaced rather than repaired because good-quality magazines such as the Metalform are relatively inexpensive. But when it comes to .22s, the situation is different.

I will note that Metalform offers a very high-quality, durable magazine for the original Colt conversions that in my opinion performs better than the original. I usually have no problem with .22 conversion magazines or the Browning Buckmark, receiving orders from Brownells in a timely manner. Ruger magazines are, of course, widely distributed and easily available. But, at this date, an order for a Walther PPK/S .22-caliber magazine has been on backorder for nearly a month.

Almost every magazine-related problem with the .22 results from releasing the bullet too early in the feed cycle. The rule with magazines is: If it releases too late, open the magazine lips; if it releases too early, close them. When the magazine has become worn, carefully pressing the feed lips together is usually all that’s required to restore good function. I still remember the

exact dimensions for High Standard .22 caliber feed lip dimensions. .236 to .238 is the proper dimension.

Naturally, a magazine that is feeding too late in the cycle and jamming bullet noses in the wrong place can be corrected by squeezing the lips together, but in my experience this problem is much rarer than a mag that feeds too late. I recently encountered a problem that can affect .22-caliber revolvers. Many shooters like to fire .22 Short cartridges or the CB Caps in their .22s. (They will not function in .22-caliber automatics.) The problem is the case is slightly shorter than the .22 Long Rifle.

Over a period of time, powder or lead will build up in the end of the chamber, thus making it impossible to chamber a standard .22 Long Rifle cartridge. I recently ran across a .22caliber Taurus with just this problem. Strangely, the problem was limited to just one chamber. The other chambers were dirty, but the offending one was very rough. No doubt, the problem eventually would have extended to all the chambers.

When it comes to reliable feeding and extraction, there are a few .22 automatics that are more troublesome than others. As I mentioned, lubrication, magazine feed lips, and the propcontinued on page 16)

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er ammunition are the first experimental paths you should venture down. Fortunately, .22-caliber ammunition is inexpensive enough that it's possible to test a wide variety. If feeding problems persist, there's something else you might want to look at: the breechface or face of the bolt. The case rims of .22-caliber ammo are not perfectly consistent.

Match competitors have proven this, and there are special gauges available for measuring .22-caliber case rims. These dimensions sometimes affect reliability, and a simple polish of the breechface may cure some of these problems and make the cartridge feed more smoothly. The problem is that, as the cartridge feeds into battery, the casehead strikes the breechface.

Any rough spots, tool marks, or deep scratches can adversely affect feeding, as these marks allow the cartridge case to develop "traction" on the breechface. And in this case, traction is not a good thing. A cleaning rod with a small patch of cloth coated with polishing or honing compound can work wonders. The Buckmark is easy to work in this manner; the Walther PPK and Bersa require more effort but the results are equally worthwhile.

It's clear to me that shooters don't always give their rimfire handguns the same attention they give to their centerfire guns. But while the application may be less critical, the need for reliability still exists. Since rimfire handguns are often repaired with simpler techniques—cleaning and tweaking rather than parts replacement—they can be especially profitable for the gunsmith familiar with their unique problems.

RIFLES

Making a Barrel Chamber Neck and Leade Section

A partial chamber reproduction of the neck and leade can serve a number of useful purposes for your customers. And everything you'll need to make one may be right at your fingertips.

BY NORMAN E. JOHNSON JUNE 2008

ORIGINAL PP. 10-11

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Original caption: Right top: Shown here are short barrel chambers along with the reamers used to make them. From the top, the cartridges are the 5mm/35 SMC and the 6mm PPC. These short chambers can be made to fit any cartridge.

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Original caption: Right bottom: Here a short barrel section is in the lathe chuck being reamed for the 5mm/35 SMC cartridge. error is further compounded if the bullet is seated to touch the lands, preventing free travel of the bullet as it enters the chamber leade. All this can be checked with the duplicate chamber neck tool. Chambering the short piece of barrel cutoff can be performed with the piece centered in a lathe chuck.

As I was cutting a short section of muzzle from a target rifle barrel, an idea struck me. Why not run the chamber reamer into this short piece as a convenient way to check the chamber neck and throat section of the barrel? There would never be a better opportunity to see the chamber neck close up, which is often an area of question with gunsmiths. As a longtime accuracy handloader, I saw a need for this reproduction of the chamber neck and leade here, too.

The closer the case neck diameter is to chamber neck diameter, the better it is for accuracy during load workup. When the overall case tolerance is close and

bullet alignment with the case neck is truly coaxial, a favorable condition exists. Further, as neck walls thicken during repeated firing, the case-neck-to-chamber-neck tolerance may be diminished. This can create a restricted bullet-pull from the case mouth, resulting in a dangerous condition as pressures rise.

This is particularly true where maximum or nearmaximum handloads are used. The

It's only necessary to cut the chamber until the case datum line makes contact, thereby establishing a limit to case entry into the partially cut chamber. In this way, the critical points can

MAKING A BARREL CHAMBER NECK AND LEADE SECTION CONTINUED

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Properly stamped, each shows cartridge identification as well as neck diameter. Far Determining proper bullet-seating depth becomes an easy procedure in this way. be closely examined with a magnifying glass. This includes the area of case shoulder contact, and the entire chamber neck and rifling leade (throat). The finished part should be properly labeled for the individual cartridge being used.

In the bullet-seating process, the duplicate chamber-neck section can A special chamber-neck gauge designed by author is used to accurately measure case-neck diameter. conve-

niently be used in the important role as proper seating depth is being established. As a bullet is being tested for seating depth, it can be left long and tested for bullet/rifling engraving as the case is inserted into the chamber neck.

This is a very handy procedure using the short neck-leade section of the barrel to establish the important overall length of a cartridge. Monitoring the case-neck wall thickness and overall loaded-case neck diameter is equally important to your customers who are handloaders. This condition can be checked in seconds by inserting the loaded round into

the chambered, short section. This amounts to double the case-neck wall thickness added to bullet diameter.

Thus you will know immediately when and to what degree case necks need to be turned. Conclusions Making up a duplicate, short section of the chamber neck and leade will result in a most useful tool for the rifleman/handloader who stands to benefit in many ways through its use. Thus, the cost and time involved to make the chamber neck and leade section is well worth the effort. I

MAINTENANCE & REPAIR

The Gunsmith: Jack of All Trades and Master of All

No profession demands as wide a range of mechanical knowledge as that of the gunsmith

BY ARTHUR J. HUNT JUNE 2008

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Nowhere in any repair field is there such a heavy demand for such diversified knowledge as there is in gunsmithing. From removing a live round wedged in a receiver to rebarreling a rifle to building a custom firearm, the responsibility for knowing so much doesn't fall on anyone like it does on the gunsmith. Even a rocket scientist works as part of a large team, where each individual only knows a specific part of the overall process.

If you look back over your records of the repair jobs you've done in the last six months, for example, I bet you'll be amazed at the various types of guns, the number of different manufacturers, and the variety of problems you've been called upon to solve. You must have a great deal of knowledge and resourcefulness to do what you have done. And knowledge and resourcefulness are what make a good gunsmith successful.

When you look back at those jobs you've done in the last six months, think about how many of those guns came back to you with the same complaint. If your returns are on the order of one percent or less, you're doing one fine job and have reason to give yourself a pat on the back. If your returns are closer to five or 10 percent, then you have to be honest with yourself. Maybe you need to pay a little more attention to detail. On the subject of returns, my advice is: Always guarantee your work.

If you do a repair that you know is not going to hold up very long for one reason or another, put a note to that effect on the repair ticket and have your customer sign it. In this way he has been advised and can't come back on you. Furthermore, if a gun is dan-

gerous and you don't think it's in your best interest (or anyone else's) to "fix" it, don't take the job.

If the customer insists he just wants to hang the gun on the wall, have him sign a disclaimer stating that you have advised him your work on the gun is for cosmetic purposes only, and he has been advised that the gun is unsafe to shoot. In my opinion, guaranteeing your work means you don't charge for doing the same job twice. Doctors and lawyers get away with doing that, but that's why people don't like them and don't trust them.

Even if what went wrong is not your fault, it's better to eat the expense and do something over than it is to argue with your customer and have him badmouth you around the range or the hunt club. Speaking about doing something over, I'll tell you a true story. I had done 15 or 20 rebluing jobs for a pistol collector. These bluing jobs were a work of art, and I don't think anyone could tell them from a factory job.

On one day, I returned two pistols to him, and he called me later to voice great dissatisfaction with them. I told him to return them at once, which he did. Upon examination, both looked like perfect bluing jobs to me. Well, I waited a week, oiled the guns up, and returned them without touching them. Upon receipt of the guns, he called me again, this time to tell me how pleased he was with the "new" bluing jobs. I thanked him, and I'm still bluing guns for him. How do you figure that one? I don't know.

Maybe he was having a bad day when he saw the guns the first time. The important thing is that I didn't argue with him and now he's happy. Such is a gunsmith's life, I guess. There are people who are never satisfied and will complain over nothing. In that case, you could try my technique of taking the gun back and doing nothing to it (assuming, of course, there's nothing wrong with the job you did). Then call him in a week and ask him to try it again.

If he comes back again and cries over something you didn't do, tell him you'll simply have to spend more time on the gun and then do something that shows you worked on it like polishing all the parts or something. Check the gun out so you're sure it's all right, and then give it back to him with a big fat bill. Usually, if a complainer gets stuck with a big bill, all of a sudden the gun starts working fine and you'll never see the guy again. Which is good; you don't need the aggravation.

And then the next customer through the door will be the guy who wants you to accurize his Raven 25 because he can't hit a target at 50 yards. Give him an estimate and take the job if you have the brains of a squirrel. Or do what I do: Tell him that the gunsmith in the next town specializes in accurizing .25-caliber semiautos and send him over there. So you see what I mean when I say "master of all trades"? The gunsmith isn't just a master mechanic, machinist, and engineer.

If he's going to survive in this business, he also has to be a master diplomat, babysitter, and psychologist. And maybe a bit of a comedian as well. I

RIFLES

Simple Crossbow Mods for Improved Performance and Safety

The energy behind the projectile might come from a different source, but many components of the crossbow are similar to that of a firearm and can benefit from the attention of the innovative gunsmith.

BY NORMAN E. JOHNSON JUNE 2008

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A crossbow is not entirely a bow nor is it a rifle, though it does have elements in common with both. Like a rifle, the crossbow has a stock, a scope sight, a safety, and a trigger, and is fired from the shoulder. The recent surge in popularity of the crossbow provides some new opportunities for the gunsmith. And while some of the better models are superbly designed and built, there are still practical measures that can be taken to improve safety, ease of use, performance, and accuracy.

One thing that sets a fine rifle apart is its high-quality trigger. Similarly, work performed on a crossbow trigger mechanism can significantly improve its overall function. In this article I'll detail one such recent project. The trigger on this crossbow had a very hard pull at 7 pounds 11 ounces. The trigger was also positioned too far forward, making it awkward to reach while

holding the pistol grip. Many crossbows share the problem of a very hard trigger pull.

In a series of crossbow triggers I tested, the trigger pulls ranged from just under 2-1/2 pounds to nearly 9 pounds, with most around 8 pounds, which seriously compromises its potential for precision shooting. Typically, the crossbow has a trigger/sear mechanism that's very similar to a rifle, but is essentially nonadjustable. The major difference lies in the cocked and loaded string latch (sear).

The Horton crossbow used in this article has a bow draw weight of 175 pounds, producing well in excess of 100 pounds of pressure on the cocking mechanism by the bowstring and resulting in a trigger and sear break that requires a very hard pull. As I mentioned, the trigger was also located far forward of the pistol grip, making it very awkward to reach and pull while aiming and firing.

The solution I came up with to solve both problems was to install a secondary trigger midway between the existing trigger and the pistol grip. The secondary trigger is linked to the existing front trigger, providing a variable geared-down pull ratio, depending on the link position used on the secondary trigger. The resulting trigger travel on the secondary trigger is proportionally greater, of course, but the new trigger (silver in color) is installed directly behind the original trigger (black).

Note how far forward the original trigger is positioned, making it almost impossible to reach. Its movement is very smooth and positive. The operation of the crossbow's safety is not affected in any way by installation of the second trigger. As the photos show, the major trigger parts were made of cast aluminum. The link between triggers is made of 0.095-inch-diameter steel rod

SIMPLE CROSSBOW MODS FOR IMPROVED PERFORMANCE AND SAFETY CONTINUED

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From the left are the triggerguard, trigger shoe with attaching hole and three holes for link adjustment, the connecting link, the milled base for trigger attachment (with screws), and the walnut pistolgrip extension cap. stock and is retained with #4-40 nuts at the threaded tips. The base of the trigger is attached to the frame of the crossbow with three #6-32 countersunk socket-head screws.

Making and Installing The Trigger Parts The trigger attaching base was made to size from 1/4-inch-thick aluminum plate with a slot milled to retain the pivotal end of the trigger. A #4-40 screw is used to attach the trigger to the base. The trigger shoe is also cut from 1/4-inch aluminum plate, shaped with a curve to fit the finger. The three linkage-adjustment holes in the trigger are spaced 1/4 inch apart, beginning 3/8 inch from the trigger-attachment hole.

The trigger link, which joins the two triggers, is 1.45 inches long. The very short pistol grip, the excessive length between the grip and the trigger, and the lack of a triggerguard are all puzzling features of this crossbow. The secondary trigger is linked to the original trigger, providing the necessary mechanical advantage as well as better ergonomics. The trigger guard and addition to the buttstock further enhance safety and practicality.

I made a steel tip and attached it to the tip of the original trigger with J-B Cold Weld. This tip has a hole in it for the trigger link. The tip connection serves to lengthen the original trigger by about 3/16 inch, thus providing some additional leverage to the system. The photos show how the whole system is put together. Actually, the original trigger is undisturbed by the connecting link at the tip and can still be used, assuming the shooter has a sufficiently long trigger finger.

For other crossbow models, there is some leeway in making the trigger system to fit while staying with the basic concept described here. Other Improvements I'm not sure why, but several crossbows from various manufacturers do not have the sort of trigger guard commonly found on a firearm, and their triggers are quite unprotected as a result. I chose to add a trigger guard to this crossbow. It was shaped from 1/8 x 3/8 inch steel, and is large enough for a gloved finger to enter the loop.

The trigger guard is attached with two #10-24 socket-head screws onto the forward part of the pistol grip and to the frame at the front. It provides the needed protection for the triggers. I also added a 3/4-inch-thick pistolgrip cap made of walnut. It's attached with four #10-24 flat-head screws.

SIMPLE CROSSBOW MODS FOR IMPROVED PERFORMANCE AND SAFETY

CONTINUED

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Above left and The new trigger is much easier to reach (right) while comfortably holding the lengthened pistol grip. The link between the triggers is in the center position, reducing the pull weight from 7 pounds 11 ounces to 2 pounds 8 ounces. This cap or extension provides a better grasp of the pistol grip during shooting, as well as enhancing the appearance of the crossbow. Conclusions I used a Lyman digital trigger-pull gauge to test the crossbow's trigger after the modification.

With the adjoining trigger link installed in the upper hole, reduced from pound 10 ors at the central hole resulted in a pull weight of 2 pounds 8 ounces. The lower link hole resulted in a 3 pound 5 ounce let off. This, I

believe, provides a nice range of adjustments. The trigger pull was very smooth and uniform with the new system.

Reach with the finger to the secondary trigger from the rear of the pistol grip was changed from a nearly unworkable 4 inches to a comfortable 2- 3/4 inches, with room for the three lower fingers surrounding the lengthened pistol grip. erting the crossbow trigger in corrected two problems, king it much easier to shoot. Plus, the trigger guard makes it safer to handle. The cost of the materials was minimal, with my time being the only real expenditure.

All in all, I thought this was a worthwhile project, especially since it has brought a whole new clientele into my shop. I

PISTOLS

Working the S&W Top-Break .38 Single Action, 2nd and 3rd Models

The .38 Single Action 2nd Model, first offered in 1877, introduced many of the features that would be applied to all subsequent Smith & Wesson top-break models.

BY DAVID R. CHICOINE JUNE 2008

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Original caption: Right top: The Smith & Wesson .38 Single Action 3rd Model, also known as the Model of 1891, was the final and most refined model in this series and the first with a removable, bow-shaped guard.

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Original caption: Right bottom: The Mexican Model was a variation of the .38 SA 3rd Model that converted the 1891 back into a spur-trigger single-action similar to the 2nd Model. subsequent S&W top-break models. To open the .38 SA, you first lift upon the T-shaped barrel catch and then tilt the barrel downward. Opening the barrel results in simultaneous, automatic ejection of the cartridges, a feature common to all these top-break revolvers. Compared to the 1st Model, the .38 SA 2nd Model was simplified in many areas.

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Smith & Wesson introduced the .38 Single Action 2nd Model in 1877. Like the 1st Model, which we covered in the March 08 issue, the 2nd Model is a spur-trigger single-action revolver with a roundbutt grip. All Smith & Wesson revolvers of this frame size held five-shots and were chambered for the .38 S&W cartridge. These included the .38 Double Action (see American Gunsmith, April 08) and the .38 Safety Hammerless (August 03 issue) revolvers.

The .38 Single Action 2nd Model was the “parent” of these later models, and introduced many of the features that would become the standard for all

For one, the extraction system was changed from the early rack-and-gear to a far less complicated hook-and-pivoting-pawl system mounted on the cam itself. The new system was faster to manufacture, used fewer parts, and was considerably more reliable. Later in

the production of the 2nd Model (about 1880), the extractor cam was further simplified to the sliding-bar type.

The extractor shank was also reshaped from square to pentagonal, and the extractor housing on the barrel was shortened into what became its final form. Other changes introduced with the .38 SA 2nd Model included a machined cylinder catch-point on the bottom of the barrel catch, which replaced the separate cylinder catch

WORKING THE S&W TOP-BREAK .38 SINGLE ACTION, 2ND AND 3RD MODELS CONTINUED

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.38 Single Action is shown here with the barrel opened for loading and unloading. Note the interesting engraving on the back-strap, mounted in the barrel's top-strap. This change allowed a lower profile to be maintained at the barrel top strap and frame ears. The base pin was now provided with an interrupted thread, mating with a corresponding thread inside the cylinder axis, to help hold the cylinder in place during extraction.

Around the same period, a hardened-steel recoil plate was added to the front of the frame around the firing-pin hole. The most common barrels on the 2nd Model were 3-1/4, 4, and 5 inches, with 6 inches being less common and 8- and 10-inch barrels (introduced about 1888) extremely scarce. This was a good selling revolver, at least in the shorter barrel lengths. From serial #1, made in 1877, the 2nd Model remained in production until 1891. Over that 14-year period, 108,255 .38 SA 2nd Models were manufactured.

In 1891, Smith & Wesson introduced the .38 Single Action, 3rd Model, which is also known as the Model of 1891. The 3rd Model was the last and best design in the

.38 Single Action series. The 3rd Model incorporated all the engineering changes and improvements taken from the current New Model No. 3 .44 Single Action revolvers, except for the hammer/barrel-catch interlock feature.

Like the much larger New Model No. 3, the .38 SA 3rd Model also used a conventional trigger with a removable, bowshaped trigger guard as well as a rebounding hammer. (Since 1878, a rebounding hammer feature was used in the .32 Single Action and the .44 New Model No. 3 revolvers.) The hammer on the 3rd Model was changed to a comfortable, checkered, oversized spur.

The trigger spring was changed from the small V-type mounted in the rear of the trigger on previous models to a heavy leaf-type spring pinned into the front grip strap of the frame. Also eliminated was the separate cylinder-stop plate used on 1st and 2nd Models. This area was now covered by the removable triggerguard, which held anew stop spring fitted into a dovetail on the inside of the guard.

Aside from lacking the hammer-interlock feature, the .38 SA 3rd Model looks like a scaled-down version of the .44 New Model

No. 3. The .38 SA 3rd Models were also sold as combination sets, with extra single-shot barrels in .22, .32, or .38 calibers and in 6-, 8-, and 10-inch lengths. Included with the set would have been over-length, hard-rubber target grips. Target sights were also available for the first time on a .38 frame revolver with the 3rd Model.

The Paine front target blade was standard, but the factory also offered many optional target-sight choices. Also available was anew barrel-catch/target rear sight, adjustable for both windage and elevation. An odd variation on the Smith & Wesson .38 Single Action 3rd Model was the so-called "Mexican Model." This was basically a .38 Single Action 3rd Model fitted with a removable sheath trigger guard to make it into a spur-trigger type.

A special spur trigger and a different hammer with a small, checkered spur came with the package. These changes made the revolver into what appeared to be a "morphed" .38 Single Action 2nd Model. In the Mexican Model, the half-cock notch was omitted; it used

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Smith & Wesson .38 Single Action, 2nd & 3rd Model Top-Break Revolver 110 Barrel 111 Frame 112 Cylinder 113 Base Pin 114 Gas Ring 115 Sideplate 116 Trigger Guard, Mexican 117 Trigger Guard, 3rd Model 118 Grip only the rebounding position and full cock notch. For a short time during production, Smith & Wesson also offered a spur-trigger kit consisting of a guard and trigger only. This allowed an owner to convert a 3rd Model into a spurtriggered gun.

A gun converted with this kit would not be a true Mexican Model, since it would still have the wide spur hammer with the half-cock position. The number of true Mexi- 119 Grip 120 Hammer 121 Extractor 122 Extractor Rod 123 Trigger, 3rd Model 124 Trigger, 2nd Model 125 Extractor Cam 126 Barrel Catch 127 Stirrup, 3rd Model can Models produced has been estimated to be around 2,000, with the majority of the revolvers being shipped to Mexico, South America, and Russia. Disassembly Instructions 1.

As always, check first to be sure the revolver is unloaded.

Hold it firmly by its grip with your finger well away from the trigger (#123 or #124) and with the barrel muzzle pointed in a 128 Stirrup, 2nd Model 129 Cylinder Stop 130 Trigger Spring, 3rd Model 131 Trigger Spring, 2nd Model 132 Cylinder Stop Spring 132a Cylinder Stop Spring, 2nd Model 134 Mainspring 135 Hand Spring 136 Barrel Catch Cam Spring 137 Extractor Spring 138 Strain Screw, 3rd Model 139 Barrel Catch Screw 140 Extractor Stud 141 Hammer Stud 142 Hammer Stud Nut, 3rd Model 143 Joint Pivot 143a Joint Pivot Screw 144 Grip Screw 145 Sideplate Screw (long) 146 Sideplate Screw (short) 147 Stop Plate Screw 148 Strain Screw, 2nd Model 149 Trigger Guard Screw, 3rd Model 150 Stop Plate 151 Hand 152 Barrel Catch Cam 154 Front Sight safe direction.

Using your other hand, lift up on the barrel catch (#126), then tilt the revolver barrel all the way down to open the action. This will expose the rear of the cylinder (#112) so you can check to be certain the cylinder is unloaded. If cartridges are present, remove them to a separate location away from the gun. 2. To remove the cylinder, hold up on the barrel catch and at the same time

WORKING THE S&W TOP-BREAK .38 SINGLE ACTION, 2ND AND 3RD MODELS CONTINUED

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This dot is intended to be aligned with the serial number stamped on the rear face of the cylinder for reassembly. pull the cylinder to the rear while turning it in a counter-clockwise direction. This allows the cylinder to be withdrawn off the base pin (#113) to the rear. 3. Removing the barrel begins with unscrewing and removing the jointpivot screw (#143a) out from the left side of the frame hinge area (#111). Then use a straight punch to drive the joint pivot (#143) out of the frame toward the right side.

Take notice of the witness mark on the joint pivot and the matching mark on the frame. These marks must be aligned for reassembly. The barrel (#110) is now free and can be lifted straight up and out of its joint in the frame. The extractor cam (#125), located in between the ears of the barrel hinge, is now pulled down and taken out of the barrel. Note the position of the extractor cam for later reassembly. 4.

Remove the grips and the sideplate by unscrewing and removing the grip screw (#144) and lifting the grips (#118 and 119) off the frame. Unscrew and remove the two sideplate screws (#145 and 146) on 2nd Models.

On 3rd Models, the hammer stud nut (#142) takes the place of the center or short sideplate screw. Turn the frame over onto its side, holding it by the hinge so the sideplate is facing up over a padded surface. Using a plastic or wooden mallet, strike the grip frame a sharp blow or two.

This should cause the sideplate (#115) to jump up and out of its seat in the frame for removal. Never attempt to pry off the sideplate, as serious damage to its fit with the frame could result. 5. Remove the mainspring and the hammer by using a pair of spreadertype pliers to compress the top of the mainspring (#134) so that the hammer stirrup (#127 or 128) can be rotated forward and disengaged from its seat between the ears at the top end of the mainspring.

Now loosen the strain screw (#138 or 148), which is located in the bottom-front of the front grip strap on the frame. The mainspring is now loose and can be withdrawn from the frame side. With the hammer forward, use a small screwdriver as a lever to rotate the top of the hand (#151) to the rear. Then, while holding the hand to the rear, pull the trigger and also hold it to the rear.

The hammer (#120) is now rotated about halfway to the rear and then carefully worked up and off of the hammer stud (#141) and out of the frame. To avoid scratching the frame at the recoil shield, be careful not to let the hand go until the hammer is out of the gun. 6. Remove the stop plate or the trigger-guard on 2nd Models by unscrewing and removing the stop-plate screw (#147). This is the small screw located on the frame bottom, in between the trigger and the hinge joint.

Hold the frame upside down by the grip and while holding the trigger to the rear, strike the frame just behind the hinge joint several sharp blows with a plastic or hardwood mallet. This should cause the stop plate (#150) to be shocked up and out of its seat with the frame. Never attempt to pry off the stop plate, as you could permanently damage its fit in the frame. When the stop plate has jumped loose, remove it along with the cylinder-stop spring (#132), taking note of their positions for reassembly.

On 3rd Models, unscrew and remove the guard screw (#149) and remove the guard (#116 or 117) by pull-

WORKING THE S&W TOP-BREAK .38 SINGLE ACTION, 2ND AND 3RD MODELS CONTINUED

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ing down on the front and then sliding it forward and off the frame. The cylinder-stop spring (#132) is captured by a small dovetail slot on the inside-bottom of the guard. This spring slides toward the rear of the guard for removal. 7. To remove the cylinder stop (#129) and the trigger, use a cup-tipped pin punch and a small hammer to drive out the cylinder-stop pin. This is the forward-most of the two pins that pass through the frame from side to side.

Removing the pin will free the cylinder stop, which can be pushed out toward the bottom by using a small punch through its window in the frame. Once again with a properly sized cup-tipped pin punch and hammer, drift out the trigger pin. This pin is the rear-most of the two pins that pass through the frame from side to side. On 2nd Models, the trigger is now free and can be pulled out through the bottom of the frame along with its attached trigger spring (#131).

On 3rd Models, the trigger spring (#130) is mounted on the frame, inside the front grip strap, and is held in place by across-pin running through the grip frame. Once you've driven out the trigger-spring pin with an appropriately sized pin punch, the trigger spring can be lifted out of its seat in the frame. 8. To disassemble the Smith & Wesson's cylinder, insert five fired cartridge cases into the chambers to provide support to the extractor shank.

Grab the extractor rod (#122) tightly in the jaws of a drill press or lathe chuck, and then rotate the cylinder in a counter-clockwise direction to unscrew the extractor post from the extractor (#121). Notice the witness mark on one of the rear facing legs of the extractor star. This dot is aligned with the serial numbers on the cylinder for correct reassembly.

Note: To prevent damage to the extractor spring during reassembly, hold the front 1/4 inch of the extractor rod by its head in the jaws of a drill or lathe chuck. Assemble the spring onto the extractor rod, place the

cylinder with the extractor over the rear end of the rod, and push the cylinder forward. You want to compress the extractor spring as much as possible while you're turning the cylinder in a clockwise direction until the threads have started about one-half turn.

Stop turning every one-half turn and allow the extractor to return by spring tension, then push the cylinder in to recompress the spring and continue tightening in half-turn increments until the rod is hand tight. 9.

Disassembly of the hammer starts with rotating the hand (#151) about 180 degrees to the front and pulling it out of the left side of the hammer. Use the correct size pin punch and a small hammer to drift out the pin in the center-front of the hammer. This pin holds in the handspring (#135).

The handspring is now free and will slide out of its recess in the hammer. Remove the hammer stirrup (#127 or 128) by drifting out its pin located at the lower-rear of the hammer. Be sure you take careful note of the position of the stirrup for later reassembly. 10.

Disassemble the barrel by unscrewing and removing the barrel-catch screw (#139) from the left side of the barrel's top-strap. The barrel catch (#126) is now free and can be withdrawn to the rear.

Holding the barrel (#110) in a muzzle-up position, tap the rear of the barrel top-strap on a wooden bench-top. This should cause the barrel-catch cam (#152) and barrel-catch cam spring (#136) to fall out of their recess in the top-strap. As always, take note of their positions for later 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 pulled straight up out of the barrel using parallel-jaw pliers.

That completes the disassembly of the Smith & Wesson .38 Single Action, 2nd and 3rd Models. Reassembly is relatively simple by reversing the order of the steps above.

SHOTGUNS

Reader Forum

BY AMERICAN GUNSMITH EDITORS JUNE 2008

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Marlin Model 19 Ejection I have a Marlin Model 19 that came into my shop today and it will not eject the shells. Can you help me figure this one out? I've cleaned it and the parts look okay to me. The two extractors hang onto the shell. I look forward to hearing from you. The shotgun went out of production in 1907. We suspect that getting parts for it'extractors and extractor springs, for example'will not be easy. There's worse news.

We believe this is one of the guns that Marlin has since advised not be fired with modern loads. You can check this out with the Marlin Historian at Highlighting Gun Markings I frequently see older pistols such as the P38 with lettering and markings that have been highlighted with white "paint." Have any manufactures ever shipped pistols with highlighted markings, or are these all owner enhancements for cosmetic reasons?

I would appreciate any information or advice you might have on restoring highlighted pistol markings that are partially worn off or yellowed. Specifically, how can the "paint" be removed without harming the blued finish? And then what do I use to refill the letters and mark-

ings? Thanks. John Guth Albuquerque, New Mexico We haven't seen many factory guns with inlay work, except for those coming out of manufacturers' custom shops.

On the other hand, we've seen many inlays in silver, gold, and white on firearms produced by members of the Pistolsmith and Custom Gunmakers Guilds. And many gun owners purchase inlay materials of one kind or another to jazz up their personal weapons. We've even seen a few handguns with red serial numbers, the color being provided by red nail polish overcoated with clear nail polish. In such cases, any excess can be cleaned off with nail-polish remover (acetone).

How the inlay material can be removed depends entirely on what kind of paint it is. If it's an oil-based paint, a mild solvent such as turpentine or mineral spirits can soften and eventually remove it without damage to the bluing. Water-based paints are usually easy to remove with alcohol mineral spirits, again with no danger to the bluing. To restore the inlay, we'd suggest you take a look at the Lacquer Stik from Brownells. They come in red, white, gold, silver, and black.

They wipe on easily and soon harden to permanence. Any excess can be removed with acetone. BLR Firing-Pin Removal I've got what looks like a post-1981 BLR bolt carrier and firing pin. How do you get out the firing pin without breaking the silly thing? Thanks for your help, You might want to confirm what you think you have by calling Browning but we can tell you what the Field Service Manual on the BLR says.

After you've removed the mainspring-tube assembly (including the follower), place the hammer at full cock and withdraw the bolt assembly from the receiver. Rotate the breechbolt lock (bolt head) 90 degrees clockwise, and pull it from the bolt slide (bolt body). Then drift out the firing-pin retaining pins't here are an inner and outer pin'with a 3/32inch punch, invert the bolt slide, and the firing pin will drop out.

Ruger M77 Barrel Fitting Do you know if anyone sells an action-truing mandrel for the Ruger M77 rifles? I know the barrel-shank diameter is .998 and the thread pitch is 16. I can make one if need be, but purchasing one would save me sometime. Also, if you know of anything I need to watch out for when doing a barrel setback and action blueprint, I'd appreciate your input. I've done Mauser actions, but have not performed this on a Ruger yet. Thanks.

If Brownells doesn't offer the mandrel you need, they probably know who does. If you strike out with them, mail an inquiry to John Hinnant San Antonio, TX 78269). John wrote the book on your requested subject: The Complete Illustrated Guide to Precision Rifle Barrel Fitting. It applies to all rifles. We purchased our copy from Brownells several years ago. Chamber Reamers My question is about chamber reamers. How much accuracy do you lose by using non-changeable pilot reamers?

I want to build a few custom sporters and am willing to spend the money for the interchangeable pilot reamers, but I can't help but wonder if it's really worth the money for a nonbenchrest gun. My name is on the line here, though, and I will do what it takes to make an accurate firearm. If I can hold 1-inch groups at 100 yards using a standard pilot reamer, I'll feel good with that. Thanks.

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Since all reamers are piloted, we believe you mean a solid piloted reamer when you say “non-changeable” reamer and a removable-pilot reamer when you refer to an “inter-changeable” reamer. A solid-pilot reamer has a bore-matching pilot permanently attached to the reamer. In other words, the pilot is caliber-specific. A removable setup has an area ahead of the throating section of the reamer on which bushings that match the bore size can be attached.

In any case’s olid or removable’ both types serve equally well as long as you are precise with fitting the pilot or bushing to the bore after the barrel is in your shop. A tolerance of .0002 inch is recommended, and we’ll make

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another recommendation: You might shoot 1-inch groups at 100 yards, but you should not guarantee that your customer can or will do the same. There are too many variables involved with marksmanship. Providing a target imprinted with a 1-inch group you've shot can never hurt, however. It merely shows the accuracy the rifle is capable of producing. Enfield Mods I have an SMLE No. 1, .308, that I'm making into a scout-type rifle.

The barrel cut to 18 inches, and turned to 0.555 inch for 1.25 inches to accept the original front sight. The muzzle is cut to target style, with a Williams rear sight on the barrel flat, and I've used an Advanced Technology stock set. (This stock set needed quite a bit of fitting.) My question is this: Do you think the removal of the bridge at the rear of the receiver will weaken it? I think it was mainly to accept the slots for the stripper clips.

Based on the caliber of your rifle, we think it was produced at the Ishapore factory in India during the 1960s. Designated "Rifle 7.62mm 2A or 2A1," due to the abundant markings on Enfields you should be able to confirm the date and place of manufacture by locating the initials RFI under the crown and the date under the initials. Unfortunately, India-made Enfields don't enjoy the highest of reputations for quality. That reason alone would make us leery about removing the bridge from the receiver.

Ruger Blackhawk Buntline? I recently acquired a Ruger New Model Blackhawk in 45 Colt. The gun is a blued, adjustable-sight version with about a 7-inch barrel and is in very good condition. I purchased the gun with the intention of building a longbarreled "Buntline" type gun.

The barrel change does not appear difficult, but I see two problems: One, the ejector-rod housing is attached to the barrel by a screw which threads into an insert resid-

ing in what appears to be a flat bottom drilling in the periphery of the barrel. Obviously, I must duplicate this on the new barrel. Is it pressed or soldered? Do you have any information on the size on this drilling? The second problem is the front sight appears to be soldered to the barrel and I would like to reuse it if I can. Is it soldered?

And do you have a table or other data to help estimate the needed height for the new 16-inch barrel? Thanks We see more than just two problems. First, you'd best check with ATF. They may consider a handgun with a 16-inch barrel to be classified as a rifle and illegal as a handgun. Second, barrel change on Rugers can be very difficult due to the inch pounds of torque employed at the factory to turn them in. Two methods of attaching the ejector housing have been employed.

Early models had a screwstud hole that was end-milled in and the stud was soldered on. On later and current models, the barrels were drilled and tapped. Screw sizes and heads differed for these two methods. Check them out as well as their hole depth after you remove them and before you order replacements. The front sight is indeed soldered on and a general rule for height is the rear and front must be equal. This, however, can be affected by the contour of the barrel (e.g., bull versus tapered).

Sturm-Ruger still makes a 10-1/2-inch barrel for the Blackhawk, which would be legal and eliminate some of the problems we've just described. That might be the best solution if a 10- 1/2-inch "Buntline" is enough for you. Rubberized Stock Coating? Some years back, there was an article in American Gunsmith about refinishing a gunstock with a rubberized product something like "Plasti-dip." I can't find it in my back issues and I wondered if you could help me find it.

Thanks for your time, a great magazine, and for standing up for the 2nd. We've published at least half a dozen articles on stock refinishing, patching, and repair, but we can find nothing on plastic coatings.

Such a coating would probably require a large amount of the product, since the stock would have to be immersed in it to be entirely coated. (You might be thinking about Gun Kote, which we reported on in the August 06 issue.) If any readers contact us with information on a rubberized coating that can be applied to a stock, we'll be sure to pass the info along to you. Identifying Mauser .380 Pistol I purchased a Mauser HSc .380. I would like to know a little about it. It has a double-stack magazine.

The left side of the slide is stamped with the Mauser logo and "Mauser-Werke A. G. Oberdorf a.h., Model HSc Super Cal. 380 ACP." On the right side, it's stamped "Gardone-Italy, Interarms Alexandria, Virginia." The bluing is 100 percent. The wooden grips are in great shape. It shot great at 25 yards. I would like to know if the pistol is a well-built gun and whether it was worth the \$290 I paid for it. It doesn't seem to have a lot of wear and tear.

I took it apart to clean it, and found it to be in excellent shape with no rust at all. Can you tell me about when it was made? Thank you. The pistol is a post-WWII model of combined Mauser and Italian manufacture by Ghamba. It was imported by Interarms, now defunct, from 1983 to 1985. From your description, your HSc is in 95- to 100-percent condition, with a Blue Book value between \$250 and \$350.

Generally speaking, the Mauser is well made and, if properly maintained, should perform with few if any problems for many years to come.

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Rumanian M1969 Conversion I have several of the surplus boltaction Rumanian Model 1969 .22 Long Rifle training rifles that were imported a few years ago. I would like to rebarrel them to Hornady .17 Mach 2 caliber. Would this conversion be possible or worthwhile? Is the barrel pressed or threaded into the receiver? What twist and barrel length and contour have proven to be best for this caliber?

Is there anyone that makes a quality replacement barrel for this conversion or will I have to buy a barrel blank and machine it myself? Will the original magazines continue to function, or will they require modification? Are there any replacement triggers available or do you have any suggestions on improving the factory trigger? The conversion would provide you the opportunity to enjoy shooting what we believe is the most accurate rimfire cartridge yet developed.

And, frankly, we're surprised we haven't heard of more injuries from amateur conversions. The ideal twist for the Mach 2 is 1 in 9 inches. Optimum barrel length is 18 inches. The preferred contour for best accuracy is the bull barrel. According to a previous importer of the Model 1969, the barrels are pressed and pinned in. Examination under magnification will help locate the pin. There should be no problem with original magazines that are undamaged.

Good-quality barrels are available from Shaw, Shilen, Douglas, and others. No replacement triggers are manufactured that we're aware of. This limits your trigger work to highly polishing the existing components and possibly seeking any lighter-weight related springs that are available from Wolff. Bleaching a Wooden Stock I have an old stock made from beechwood and it was stained walnut. I striped the stock but did not get all of the stain out of the pores.

What kind of wood bleach could I use to lighten up the stain or get the stain out? Thank you. Knowing the kind of stain (oil, aniline, or witch's brew) would be great help in selecting a diluant or solvent. Not having that information, we can only suggest whiting, turpentine, or mineral spirits if the stain is oil-based, or alcohol or acetone if it's aniline.

If the stain base was prepared by a witch or witches, you might try oxalic acid from a woodworker's supply store or increasingly concentrated solutions of household bleach. If you can find it in a higher concentration than 5 percent, hydrogen peroxide might also work.

We were once told by an old Transylvanian stockmeister that rubbing in some wolfsbane before bleaching often assures success

in bleaching out witch-brewed stains. But don't ask us what wolfsbane is, why or how it works, or where to get it. Feedback on "The Slurry" First of all, let me say that this is the greatest magazine. My husband and I fight over who gets to read the articles first. I do, however, have a few questions about the article on the trigger smoothing with "The Slurry" (February 08 issue).

You say that I need to pour 1/4 ounce of mineral spirits into each jar (one jar for black, one jar for white, and one jar for gray) and then add half of the black, gray, and white polish to each jar. My question is: What do I do with the balance of the 555 polish? Is it really necessary to grate 3 ounces of each, or can I just grate 1-1/2 ounce of each? If you have any further directions or instructions on this, please let me know. Thank you.

Linda Weaver Fair Grove, Missouri The article goes on to advise that you may have to add more grated polish in order to achieve the desired consistency. Hence, the need for the additional liquid and grated 555 to be standing by. The balance of the polish particles, should any remain, can be stored individually in plastic bags until they're needed. As for what remains of the bars of 555, they can always be used to charge polishing wheels as originally intended.

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