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ARCHIVE ISSUE NUMBER

INSIDE THE ARCHIVE

THE RETURN OF THE DAN WESSON MODEL 15

COMEBACK CONTINUES AT S&W • THE "NO-MACHINING" 1911 PROJECT • REBARRELING CHOICES • THE "ACCELERATED..."

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 040

DIGITAL ARCHIVE EDITION

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METALWORKING

Comeback Continues at S&W

BY AMERICAN GUNSMITH EDITORS MARCH 2007

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It was just a few years ago, it seems, that the future of legendary arms maker Smith & Wesson looked anything but certain. But since early 2004, when James Joseph Minder stepped down as chairman amidst controversy over his past, the news out of Springfield, Mass., has generally been quite encouraging.

In addition to having been the recipient of several industry awards, Smith & Wesson has been awarded numerous contracts from law-enforcement agencies to supply its new polymer-framed M&P pistols and its new M&P 15 Tactical Rifle. And S&W is set to introduce its new Elite Series shotguns and reintroduce the much-loved 1000 Series shotguns at the 2007 SHOT Show in Orlando, which we eagerly anticipate as this issue goes to press.

But the big news in December 2006 is the announcement that Smith & Wesson Holding Corporation, parent company of Smith & Wesson Corp., has entered an agreement to acquire Thompson/Center Arms, Inc., the 40-year-old, privately held New Hampshire-based manufacturer of premium hunting firearms. The sale price is

reported to be \$102 million in cash, and the transaction is expected to close in January 2007.

Thompson/Center Arms, headquartered in Rochester, New Hampshire, manufactures and distributes innovative firearms recognized by hunting enthusiasts for their precision, performance, craftsmanship, and reliability. Thompson/Center Arms occupies a leadership position in blackpowder firearms, blackpowder accessories, interchangeable firearm systems, and precision rimfire rifles.

The transaction will combine two leading firearms companies with complementary products, to yield a single-source provider of quality pistol, revolver, shotgun, and rifle products. Michael F. Golden, President and CEO of Smith & Wesson Holding Corporation, said, "The acquisition of Thompson/Center Arms is an important step in our diversification strategy. Thompson/Center Arms has consistently delivered both profits and strong gross margins while building its position in the hunting-rifle market.

This move will expand our presence in the \$1.1 billion long-gun market by providing immediate entry into the hunting rifle and blackpowder segments, which represent approximately \$600 million in domestic sales. In addition to carving out a leadership role in blackpowder and single-shot hunting rifles, Thompson/Center Arms has developed tremendous expertise in manufacturing long-gun barrels, a competency that will be important to Smith & Wesson as we expand our capabilities even further into the long-gun market.

The purchase price for Thompson/Center Arms includes the company's Rochester, New Hampshire, facility which produces all of the company's products and is situated geographically between Smith & Wesson's manufacturing operations in Springfield, Massachusetts, and Houlton, Maine. In conjunction with the acquisition, Gregg Ritz, President and CEO of Thompson/Center Arms, will be named President of Smith & Wesson's Hunting.

He will continue to lead the Thompson/Center Arms operation and will head Smith & Wesson's efforts to develop its hunting business. Editor Keith Lawrence Technical

PISTOLS

The Return of the Dan Wesson Model 15

Now under the wing of CZ-USA, this wheelgun remains high on the list when it comes to lasting accuracy. Here's what you need to know about it.

BY CHICK BLOOD MARCH 2007

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The Dan Wesson revolver never really disappeared. Its production just passed from one owner to another and another. To the credit of these manufacturers, including the newest, there's been no messing around with the design of the gun. True, CZ-USA offers a choice between a fluted and a non-fluted cylinder, they reshaped the barrel shroud, and we understand their American-made Dan Wesson will be available in stainless only, but mechanically it's the same as the Model 15-2 pictured here.

In the past, I've had owners of the Dan Wesson Model 15-2 mistakenly refer to it as a "Smith & Wesson." Wrong! Daniel B. Wesson was the great grandson of D. B. Wesson, the "Wesson" in the original Smith & Wesson. While working at S&W back in the 1960s, Daniel B. thought it would be a great idea to bring out a revolver with interchangeable barrels. Whoever was running the operation at the time said "no way." But young Dan B. didn't take no for an answer.

Instead, he opened up his own company in 1968, with far more in mind than just an interchangeable barrel. In addition to that, he wanted to produce a fresh design for a handgun whose basic format hadn't changed in about 100 years. His would be a very simple, very strong design, providing out-of-the box match accuracy with the ability to maintain that accuracy over an extended period of time. How did he do?

In its class (the production class), Dan's revolver won either 9 out of 10 or 10 out of 10 top places in metallic-silhouette championship competition for five years in a row. The Dan Wesson frame is a Magnum frame regardless of caliber.

Its mainspring is coiled instead of flat, the double-action pull is short, there's a built-in trigger-stop screw, the cylinder latch is located ahead of the cylinder where it can't interfere with the shooter's grip, and the latch locks the cylinder/crane assembly to the front of the frame. At the rear, lockup is assured by a ball bearing under heavy spring tension that seats in the center of the extractor.

These duallocking features differ considerably from the long-followed practices of revolver-locking systems employed by other manufacturers. Nevertheless, Wesson's revolver design has long been admired by shooters for its accuracy and versatility. Now, thanks to CZ-USA, anew version is back in production. a Dan Wesson has fewer parts than an S&Wor Colt revolver. Field Stripping A disassembly tool (#1) is supplied with every new revolver. If his tool, call CZ-USA and get one.

Centered a bore guide with twin lugs that fit the recesses in the barrel nut (#4). After engaging the lugs, turn the nut counterclockwise and remove it. (If you happen to unscrew the barrel simultaneously, no problem. It sometimes comes off with the nut on a gun that's less than well maintained.) Once the nut is off, the shroud (#7) is pulled free. If the barrel (#8) is still attached to the frame, unscrew it counterclockwise.

Using the largest of the Allen wrenches incorporated in the takedown tool, back out the retaining

THE RETURN OF THE DAN WESSON MODEL 15 CONTINUED

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screw (#52) and remove the grip. The next largest Allen wrench in the tool is used to undo the rear sideplate screw (#30) and front sideplate screw (#29). (Reassembly note: The rearmost is the longer of the two.) Position the gun with your palm under it. Tap the mainspring housing opposite the sideplate with a plastic mallet until the plate (#31) drops into your hand. Frequently, the hand (#38) will become dislodged in the tapping, and you'll find it nestled in the plate.

A small screwdriver is used to lift the crane lock (#42) from the frame. Remove the cylinder/crane assembly to the front. If the above seems to be going a bit beyond mere field stripping, it is. But most of the Dan Wesson revolvers that have come my way have been

pretty well fouled. (Take a look at the filth on the action in the accompanying photo.) I've always found it best to remove the sideplate in order to cleanup the crud effectively.

When you Not pictured is the .006-inch barrel/cylinder-gap feeler gauge (also included). If misplaced, any gauge of identical thickness can be substituted. When remounting the barrel, a gauge is used to establish proper clearance between the barrel and the front of the cylinder. replace the plate, be careful; the edges are extremely sharp and the front edge is the first to reenter the frame. Detailed Disassembly Cut and affix three or four layers of duct tape to the interior surfaces of a pair of smooth-jaw pliers.

Pick up the crane/cylinder assembly, and remove the bolt plunger (#36) and bolt spring (#34) from the crane (#26). Take hold of the ejector rod (#22) with your padded pliers, unscrew the rod counter-clockwise, and pull it out the front of the cylinder. Do likewise with the crane. The ejector-rod bushing (#27) and spring (#28) come out the front, and the extractor ratchet (#33) comes out the back of the cylinder. Look for a small roll pin (#23) in the crane. It retains the latch (#24) and latch spring (#25).

Use nothing other than a roll-pin punch to drift the pin to the rear until the latch and spring

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Dan Wesson Model 15 Revolver (Specifications subject to change without notice) 1 Barrel Wrench 2 Barrel/Cylinder Gauge (.006) 4 Barrel Nut 5 Front Sight 6 Front Sight Pin 7 Shroud 8 Barrel 9 Frame 10 Mainspring Guide 11 Mainspring 12 Firing Pin Retaining Pin 13 Rear Sight Tension Spring 14 Rear Sight Elevation Screw 15 Rear Sight Body 16 Rear Sight Retaining Pin 17 Firing Pin Spring can be removed upward. But don't drift the pin all the way out.

Leaving it partway in will make putting the crane/latch assembly back together much easier later on. The cylinder hand has a slot in its back. The uppermost part of the hand rests on a permanent lug on the frame. The bottom of the hand fits over a post on the trigger (#39).

To take out the hand, I use a small tool to move it just clear of the trigger post and frame lug, 18 Firing Pin 19 Cylinder Aligning Ball 20 Cylinder Aligning Ball Spring 21 Aligning Ball Screw 22 Ejector Rod 23 Latch Retaining Pin 24 Latch 25 Latch Spring 26 Crane 27 Ejector Rod Bushing 28 Ejector Spring 29 Short Sideplate Screw 30 Long Sideplate Screw 31 Sideplate 32 Cylinder 33 Extractor then use the tool again to lift the spring (#43) out of its slot in the hand.

The same tool remains in play to lift the front leg of the trigger spring (#41) off the trigger so the spring can be taken out of the frame to the left. This will leave the connector (#44) "which is more frequently called the "transfer bar" and its spring lying in their frame recess. Tweezers remove both.

Depress the back end of the bolt (#37) to clear the frame and remove it to the 34 Bolt Spring 35 Shroud Locating Pin 36 Bolt Plunger 37 Bolt 38 Hand 39 Trigger 40 Front Sight Retaining Screw 41 Trigger Return Spring 42 Crane Lock 43 Hand Spring 44 Connector (Hammer Block) 45 Strut Plunger 46 Strut Spring 47 Double Action Strut 48 Hammer 49 Mainspring Seat 50 Grip 51 Trigger Stop Screw 52 Grip Screw left.

Lift the long leg of the trigger spring off its shelf on the hammer and let it swing down as tension is relieved. It's time to take control of the mainspring (#11). Do so by pulling the hammer all the way back and picking up the longer sideplate screw. Insert that screw into the grip extension. There is a threaded hole in the lower end of the mainspring guide (#10). After you engage that hole with the

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The photo also reveals the relationship of internal parts as they should appear after reassembly. screw and turn the screw in as far as it will go, you've mastered the mainspring. There's no pressure on it now, so the hammer (#48) is easy to lift out to the left. Getting out the mainspring and guide should be easy, but it isn't. You have to block the upper guide with a sturdy, straight-blade screwdriver or a length of flat stock and keep blocking it as you slowly back out the sideplate screw in the grip extension.

Once the mainspring pressure is completely off, things get easy again. You can lift or dump out both the spring and guide. The hammer strut (#47), also known as the "double-action lever," is removed from the front of the hammer either to the right or the left. Also taken out to the front are the strut plunger (#45) and spring (#46).

After that, unhook the trigger spring from The pin spotlighted in this photo, as addressed in the text, may not be as easy to see on other Dan Wesson revolvers. its large, milled-out area in the hammer body. Just under the firing pin at the rear of the frame is the aligningball screw (#21). Unscrew it and you'll find the cylinder-alignment spring (#20) and ball (#19) mentioned in the earlier paragraph concerning how the revolver locks up.

Before you can remove the firing pin, another roll pin (#12) stands in your way. It's a roll pin, so you know what kind of drift punch you must use to move it. Since handguns occasionally get dropped, their sights can suffer serious damage. Replacing them on a Dan Wesson isn't difficult. The rear sight on the Model 15 is secured to the frame by its retaining pin (#16) "yet another roll pin" and the elevation screw (#14). Before you can back out the screw, the pin has to be drifted aside.

But be somewhat careful; under the body of the rear sight are two tension springs (#13) that are easy to lose once the pin and screw no longer hold them captive. Up front, just under the front sight, you may see the end of a solid retaining pin (#6). Then again, you may not, depending on how good a polishing-off job's been done at the manufacturer to blend in the end of the pin with the barrelshroud rib.

However, if you can eyeball both ends of the pin you can drift it out after you back out the front-sight retaining screw. The smallest Allen wrench on the takedown tool is intended for this purpose. With the pin and screw both removed, grasp the blade (#5) in your padded pliers and pretend you're the most gentle dentist in the world. As I said before, the gun I used in this article is a Model 15-2.

For some reason, the pin under the front sight was clearly visible on one side and totally invisible on the other—even under considerable magnification. It was not a through-the-rib pin. Why? I don't know. There were two ways I could have gone about removal of the front sight blade if it had been badly damaged. With a drill slightly larger in diameter, I could have drilled out the pin, replaced it with one made from drill rod, blended it to a nice, flush fit with the rib, and applied some touch-up blue.

Or I could have reached for my favorite factory adjustment fixture, a two-pound ballpeen hammer, applied the correct diameter steel punch to what I could see of the pin, and pounded it through. Undoubtedly, this desperate measure would have busted out the opposite side of the rib and bent the lower part of the sight blade in the process. Actually, I know the owner of the Dan Wesson shown here better than any other person on the planet. And I also know he wouldn't put up with such butchery.

Besides, there's absolutely nothing wrong with the front sight of this particular Model 15-2 and there never has been. I've owned it for years, and I deliberately dirtied it up so you could get a better look at how the inside of a great gun might look if it belonged to a less conscientious owner. I

MACHINING

The “No-Machining” 1911 Project

This 1911 project pistol can be put together with common shop tools, easily available aftermarket parts, a minimum of fitting' and at a reasonable price.

BY ROBERT K. CAMPBELL MARCH 2007

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Recently, I was approached by a young soldier who wished to upgrade his 1911 pistol. The pistol in question is a Springfield Stainless 1911A1. The pistol was in good shape and had proven reliable and accurate in thousands of rounds of ammunition, but the owner felt limited by the small sights'and he's among the few shooters genuinely good enough to feel limited by a pistol. I checked the pistol and found it to be a good solid piece well worth an upgrade.

Trigger compression was a crisp and clean 4 pounds, overall an above average factory trigger. The pistol fed hollowpoints and exhibited no glaring faults, despite the embryonic sights of the 1911 GI pistol. These sights simply don't make the grade in a modern-combat/general-purpose pistol. The young man also expressed some interest in front-slide serrations and possibly a match-grade barrel.

I test fired the pistol under controlled conditions and found the piece capable of five-shot 25-yard groups of 2- 1/2 to 3 inches

with good handloads and the Winchester SXT service load.

I have seen more accurate Springfields, but I've also seen worse. (The stainless pistol does seem to be better fitted and is often more accurate than the blued-steel version.) The only snag in the fabric of my plans was that this was the only pistol the young man owned, and he was loath to be “naked” for weeks while work on his slide was completed. I think many of us have run across this situation.

For some customers, time is not that important, but for the “onegun man” or perhaps a police officer, time (and, of course, reliability) are foremost. I took a hard look at what he wanted and decided he might be best served with a high-grade custom slide. I've had excellent results with Caspian slides, and Caspian offers Novak, Heinie, Bo Mar, and even GI slide cuts. Anew version of their high-grade stainless slide features an external extractor as well.

Our young soldier is conversant in the latest trends and felt that if the external extractor could be had, he would have one.

Obviously, if funds had allowed, the purchase of anew Springfield Loaded Model or Professional would of solved most of the problems. But once the plans included a match-grade Bar-Sto barrel, the accuracy of our piece would likely outpace even the best factory-made products. So, we ordered the slide.

The specs included a rear slide cut for the new Caspian tactical sight, an adjustable unit far more rugged than most adjustable sights. The front cut would be Novak. The forward cocking serrations popular with special units were specified, along with the external extractor. You might ask: Why not an upgrade on the frame? The fact is that the young man was quite happy with the lower end. The trigger compression was fine, and he had no problem hitting the slide-lock safety on demand.

The Springfield safety is well fitted, tight, and requires enough ef- The Springfield 1911A1 is a good 1911, but the Caspian slide allows the addition of modern sights and an external extractor, bringing the piece up to anew level of performance.

THE "NO-MACHINING" 1911 PROJECT CONTINUED

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It is easily adjusted for virtually any bullet weight, and is relatively snag-free. The front-slide serrations and other improvements are also significant. Fort to deploy to be termed service grade. He is one of the lucky ones who has thin strong hands and does not have difficulty depressing the tang safety on demand. No beavertail safety was needed.

I could have installed high-visibility sights such as the King's Hardballer in the existing dovetail, but the customer wanted a high-vis sight that was adjustable, if one sufficiently rugged could be found. A generation ago I would not have considered adjustable sights. But a competition shooter needs adjustable sights and our shooter wanted his .45 to be an all around service/defense/sporting pistol.

The Caspian sight has excellent adjustments, and has proven durable in firing hundreds of full-power rounds.

At about the same time I ordered the slide, Wayne Novak published a press release concerning his new sights. The Novak sight is now available with a fiber-optic insert. The Novak sight is sturdy and the fiber is firmly attached to avoid the problem of losing the fiber in recoil. As for visibility, this sight is optimal for rapid shooting. When fitting the slide, all went easily in this case.

The Caspian usually mates with the Springfield 1911A1. The most obvious difference between this and the factory slide are the high-profile sights fitted to the Caspian slide, and Colt Series-70 pistols with no fit-

ting required. Occasionally, a minimal amount of work is needed. All that was required was assembly in this case. The external extractor presented no problems. The extractor is one of the parts on the 1911 that occasionally gives me problems' most often, because the pistol has been abused.

The original extractor requires hand fitting to properly install. The replacement of an external extractor is more straightforward. The external extractor consists of the extractor, a spring, and the locating pin. To install the extractor, simply point the hook toward the chamber and place the extractor in its slot in the frame over the extractor spring. Then, place the solid pin into its slot in the slide and drive the pin in. The

THE "NO-MACHINING" 1911 PROJECT CONTINUED

ORIGINAL PAGE 9

Part Manufacturer Slide Caspian Barrel and Match-Grade Bushing/Link Bar-Sto Precision Firing Pin Stop Wilson Combat Extractor, Pin, and Spring Wilson Combat Firing Pin Ed Brown Firing Pin Spring W. C. Wolff Rear Sight Caspian Front Sight Novak Recoil Spring Guide and Plug Springfield Recoil Spring W. C. Wolff Grips Alumi Grips Front Strap Serrated Cover Wilson Combat Figure 1. Parts Used in 1911 Project Pistol pin is very hard and requires even blows to drive it into place.

To install the sights, I used the proven method of lubricating the slots and driving them in. In the unlikely event the slots were a bit loose, I could have peened the slot, but this has never been a problem for me with Caspian slides. To assemble the pistol, I came up with a list of parts. Some were available from Caspian and others were obtained from Brownells. The list of parts and supplies for this project is shown in Figure 1. I have to admit I made a mistake, simply from failing to do adequate research.

I had ordered a .45-caliber firing pin. The Caspian slide uses a .38 Super-type. There are two types of .38 Super firing pins, Springfield and Colt. These lightweight firing pins are mated with a heavy firing-pin spring to add a margin of safety if the piece is dropped. This keeps the firing pin from taking a run forward under momentum. I was able to get a .38 Super pin shipped to me in record time from Ed Brown Products. The firing-pin stop is a Wilson Combat Hardcore. This part Figure 2.

Group-Size Improvement (25-Yds. Five-Shots) Load Group Original Slide and Barrel Magnus 200-grain SWC 830 fps Titegroup 3.0 Powder in. Magnus 230-grain RNL 790 fps Titegroup 3.25 Powder in. Winchester USA 230-grain Ball 3.5 in. Winchester 230-grain SXT JHP Ranger 2.9

in. Cor-Bon Performance Match 230-grain 2.8 in. Caspian Custom Slide Magnus 200-grain SWC 830 fps Titegroup 2.25 Powder in. Hornady 200-grain JHP 1020 fps HP 38 Powder 2.0 in. Sierra 200-grain FP 950 fps Titegroup Powder 1.9 in.

Sierra 230-grain Match 775 fps Titegroup Powder 1.5 in. Winchester 230-grain SXT Ranger 2.0 in. Cor-Bon Performance Match 1.75 in. was slightly oversize, which is for the best; an oversize firing-pin stop is not likely to work loose under recoil. A few strokes of the file produced a good fit. The Novak front sight rests in the familiar .330 x .075 x 65-degree Novak cut. A bit of patience is required, and, of course, you should use a padded brass hammer.

But there was no difficulty in fitting either the front or rear sights; the Caspian cuts are right on the money. I can't help but wonder if they ever sell any GI-cut slides with the staked-in front sight, but surely there is someone somewhere who builds "retro .45s." For this shooter, the modern Novak and Caspian sights are much better suited for all-around use. After fitting the sights, firing pin, firing-pin stop, and extractor, we were ready for a firing trail.

The Springfield barrel, link, recoil guide, springs, and recoil-spring plug functioned in the Caspian slide perfectly, with no need for fitting and no slop. This is how the piece was test fired. The practical accuracy of the pistol was considerably improved, and the owner was quite happy with the improvements. I wish to point out his pistol was never out of service; he simply walked into the shop and the slide was on his pistol in a few minutes.

Of course, for the test, the pistol was well lubricated and USA ball ammunition was used. We decided to "go for the gold" and fitted a Bar-Sto Precision barrel. We needed to fit the barrel, of course, and this re-

quired that the pistol be surrendered to me for a few days. But the work went smoothly and, with a minimum of time expended, the piece was back up and running. The barrel was fitted by the proven "cut and try" method; in other words, fit the barrel a bit and give it a try.

After the barrel was fitted, the pistol demonstrated accuracy equal to or better than that of any factory pistol. You don't need extensive frame modification if the upper end is exemplarily in fit, finish, and top-grade components. A modest break-in was required with lighter target-type loads. Then the piece was broken in with one of my handloads that pushes the Hornady XTP 200-grain bullet to over 1,000 fps.

For practice, I like to use loads that area bit below the hardball range, and the piece now functions with these. The Cor-Bon Performance Match load gave excellent results, as did several of my other handloads and various brands of service-grade ammunition. (See Figure 2.) When considering any modification that entails working with the slide area, I think the option of purchasing a quality custom slide is a good one.

The ease of modification' comparatively speaking'and the economy of time strongly recommend this option. The pistol illustrated in this report demonstrates that this course is well worthwhile. In conclusion, I was pleased to note that the tang safety was free of the sharp edges found on some pistols, and the arched housing and short trigger gave good results. Overall, I'm very happy with the fit and feel of the Springfield piece.

Personally, I would have fitted an Ed Brown beavertail safety, but as long as the shooter was happy with what he had, this was not necessary. I

METALWORKING

Rebarreling Choices

There are numerous decisions to be made before an action is rebarreled, including the type of steel, how it's rifled, rate of twist, and contour. Only after those decisions are made is it time to pick a barrel maker.

BY DENNIS A. WOOD MARCH 2007

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We're fortunate to have a multitude of barrel makers putting out excellent barrels for us to choose from. The choice we make when selecting an aftermarket barrel usually depends on the intended use along with the price for fitting and chambering the barrel to the action.

Once we understand the process of putting the rifling into a steel tube and which method suits our needs best, the choice for the intended application becomes much easier and a customer looking to us for advice will know that he came to the right place. steel (416). Both materials have their advantages and supporters of each material make some very good arguments. The reamer on the left imparts a smooth finish to the bore. The through holes allow coolant to flush out chips and cool the cutting action.

Barrel Steel There are two types of barrel steel most commonly used these days for smokeless-powder firearms'chrome molybdenum (4140) and stainless Rifle-barrel blanks are usually rolled into shape during

the forming process, which introduces a lot of "stress" into the barrel metal by compressing the molecular structure of the steel.

To relieve the stress or "normalize" the barrel steel, a heat-treating process is used to take the barrel temperature close to the critical point and then let it normalize to ambient temperature. Chrome molybdenum is an alloy steel containing chromium and molybdenum'not surprisingly'along with carbon, silicon, and manganese, and with trace amounts of phosphorus and sulfur.

There are twelve grade designations as defined by the American Society for Testing and Materials (ASTM) that comprise the 4100 series of chrome-moly chemical compositions that contain both chromium and molybdenum along with gradually higher amounts of carbon and manganese. The silicon, sulfur, and phosphorus contents are listed as the maximum amount contained,

but remain the same throughout the eight grades that are considered most appropriate for barrel steel.

When we get into the so-called nickel, chromium and molybdenum grades of steel, the grade designations reach the 4300 series. The accompanying chart breaks down the most common chromium-molybdenum steel compositions, with the 4140 type used most often for barrels that will receive a blued surface coating. As you can see, the differences in carbon and manganese are slight and overlap as they get higher from one type to the next.

If the 4140 barrel steel chemical composition doesn't fall within the chemical range as listed, then it's not officially 4140 barrel steel. The stainless steel used most for barrel blanks is the 416 series, and here we don't see many choices available from the steel mills. What is supposed to make the 416 stainless steel durable is the high content of chromium, although more manganese is added to the chemical mixture to make machining the barrel steel easi-

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er. Several barrel makers have told me they see no difference in the life span of a stainless-steel barrel compared to one made of chrome-moly. Rifling Styles Back when I was in my early teens, I always made a stop at the Trading Post in uptown Racine, Wisconsin, whenever I was near the store. This was a gun shop of sorts, and I liked to ogle all the guns I was unable to own at the time. But what I found really interesting was what went on in the store's lower level.

Down in the basement was the shop where Barrett "Boots" Obermeyer was busy cutting rifling in barrel blanks. Obermeyer used "cut" rifling in his famous R5 rifled barrels having five lands and grooves, somewhat like the 1917 Enfield barrels. Obermeyer is no longer in Racine, as his barrel making is now done in Bristol, Wisconsin, and he's kept very busy making pressure and test barrels.

With this style of rifling, each groove is cut one at a time with multiple passes until the lands remain at a height of .005 inch or so. This is a tedious process, but there are advantages to this method of rifling a bore. Cutting the rifling into the bore does Barrel Steel Chemical Ranges and Limits (%) not produce any additional stress in the barrel steel, so this process can be done on a fully contoured barrel, even one that's been fluted.

Once the rifling is complete, the bore is hand lapped with along, pure-lead lap embedded with the correct grit to achieve a smooth internal finish. Cutrifled barrels are said to be the most accurate barrels, and barrel life exceeds that of barrels using other methods to create rifling. Other barrel makers who use the cut-rifling process include Krieger Barrels and E. R. Shaw.

The machinery used to cut rifling into a barrel blank bore isn't made any longer, so what's in use today is what was in use when this type was a more common

method of rifling. As long as the carbide button stays on track, the rifling is consistent and a good rifle bore is produced. Button rifling displaces or swages the barrel steel outward and "work hardens" the internal surface being formed in the barrel. This takes much less time than cutting multiple passes into each of the grooves, one at a time.

As the rifling is cold-formed into the bore, stress is once again induced into the barrel metal. With button rifling, barrels are also lapped to even out any tight or hard. Because of the timeconsuming nature of the cut-rifling process and because the barrel maker pretty much has to make his own cutting tools, a process known as "button rifling" came on the scene.

A carbide button, shaped sort of like a tiny football with grooves and lands ground into it, is pulled or pushed through the barrel from rear to front until the rifling is cold formed into the barrel.

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spots in the barrel interior. The rifled bore is then measured with an airgauge to determine uniformity. Barrels are then sorted, so you will see varying grades of button-rifled barrels. The higher-grade button-rifled barrels are those that are most consistent in bore size throughout their length, therefore the price of these match-grade barrels will be higher.

Cut-rifled barrels do not have different grades, as the process produces consistent groove diameters and land widths each and every time with virtually no residual stress left in the barrel steel. Button-rifled barrels are usually stress relieved after the rifling process. The hammer-forging process was developed by the Germans just prior to World War II to quickly “hammer out” barrels for the war effort.

With this process, a mandrel with a mirror image of the rifling is inserted into a slightly oversized hole in the barrel blank and a series of hardened rollers hydraulically compress the outside diameter until the inside diameter forms around the mandrel. With this process, even the chamber can be formed with a specific mandrel for a particular caliber. These days, virtually all of the major firearms manufacturers use the hammer-forging process to install rifling in their production barrels.

This cold-forming process will impart a lot of stress into the barrel metal, which is why some hammerforged factory barrels will move around a bit when they heat up from firing if the stress in the barrel isn’t previously relieved somehow. With even the best

procedures used to remove stress in barrels created by the hammer-forging process, some residual stress remains in the steel.

With any barrel blank, a hole must first be cut through the blank with a deep hole drill, leaving around .005 inch or so for a hole reamer to finish up the bore to provide a smooth internal surface. With the hammer-forging process, a very smooth internal finish is produced during the forming of the rifling because a honing step is added after the reaming process. It takes only three or four minutes to hammer forge rifling into a barrel, which is why firearms manufacturers use this process to make their barrels.

Barrel Break-In: Myth or Magic? Much has been written about how a new barrel should be broken in, and opinions run the gamut. Some of the recommended procedures call for bore scrubbing after each shot fired for “X” number of rounds, and then bore cleaning after every 10 rounds or so. Obviously, some bore cleaning will be in order after some number of bullets have been sent downrange.

Since bores have been lead-lapped on all barrels that are cut or buttonrifled, what would be the purpose of scrubbing the bore after each round during a so-called break-in period? Lead lapping has already removed or smoothed out the annular rings in the barrel caused by the deep-hole drilling and reaming process, and hammer-forged barrels have been honed to smoothness before the rifling was cold formed inside the barrel. So why do we need to break-in this new barrel?

The one area that may cause some concern is just ahead of the chamber. The throat or leade which was cut during the chambering process (which has nothing to do with the barrel maker) may have caused some rough spots in the form of roll-over burrs on the now tapered rifling in the throat. The chambering or throating reamer cuts when rotated in a clockwise direction, so it will leave roll-over burrs on the trailing edge of the cutting action which would be the left side of the lands.

If there are any rough areas caused by the chambering process, tiny bits of metal will be shaved off the bullet as it passes over these areas and deposit themselves somewhere along the rifling. Following bullets passing over these small bits of material will pound them tighter onto the bore’s internal surface.

As a result, some bore cleaning at a more frequent interval may be necessary with a new barrel until the flame temperature and sandblast effect of the gun powder from 50 or so fired cartridges burn off any burrs that may be present in the throat area. Another process that has received some press over the last few years involves “fire lapping” a barrel to smooth out rough spots. With this procedure, grit-impregnated bullets are fired down the barrel, causing a lapping effect on any rough or tight spots in the barrel.

Rifling lands are thin with crisp corners made to imprint the bullet and create a spinning effect that guides the bullet accurately toward the target. Lapping off these crisp corners and reducing the height and/or width of the lands could do more harm than good if the fire-lap-

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ping process is overly done. Fire-lapping kits are available for both centerfire and .22-rimfire calibers, with grit-impregnated bullets for centerfire rounds and coarser fine-grit ammunition for the .22 rimfire. Keep in mind that the lands in most .22-caliber rimfire barrels are only around .002 to .003 inch high, so how many of these grit coated bullets would it take to affect the leade and rifling in these guns?

In my opinion, this would be a drastic measure for a very rough barrel that should probably be replaced anyway. Fire-lapping has been reported to move the throat or leade forward up to 1/4 inch after the process was performed. This additional gap will cause the bullet to "jump" until it engages the rifling, which is not conducive to the best of accuracy, since the farther the bullet must jump to engage the rifling, the more of a chance there is that the bullet may tip slightly.

Short-Chambered Barrels There are at least three barrel makers that I'm aware of who offer semifinished barrels for popular rifle actions. These barrels are fully contoured, crowned, threaded, and chambered to within .050 inch or so of final fit. All that's needed is to remove the old barrel, install the replacement barrel, and then run a chambering reamer through the action and finish cutting the chamber until headspace is correct. Sounds relatively simple.

When customers approach me when they are considering having a rifle action rebarreled, the first question I ask is, "What are you hoping to gain over what you have

now?" There are three common answers: "I want a different caliber"; "to get better accuracy"; or "my barrel is shot out and I need anew one." If the customer says he thinks the barrel has been shot out, we discuss how much shooting he's done over the time he's owned the rifle.

Rarely does a deer hunter who sights his rifle in once a year and then maybe fires a couple of rounds during hunting season put enough rounds through his barrel to shoot it out. More often than not, a thorough cleaning of the barrel will get it back to the accuracy he was once accustomed to. On the other hand, a varmint hunter, especially one whose target is prairie dogs, can burn a lot of ammo during his trips to a prairie dog town, and may shoot the throat out of a barrel rather quickly.

Getting better accuracy or changing the caliber of his rifle usually involves more questions and discussion. Five lands and grooves are said to provide the optimum stabilization of the bullet. Top-notch accuracy expectations will require that the front face of the action be trued up perpendicular to the bore centerline, and the engaging faces of the locking lugs be lapped to full contact with the mating surfaces in the action.

The bolt face might need to be squared up so it too is flat and will direct a cartridge straight into the chamber. Just changing calibers may not require the above expected degree of accuracy, so in that case the shortchambered barrel may deliver all the accuracy the owner is expecting to see and willing to pay for. The main benefit of actu-

ally fitting anew barrel is having the barrelshank threads turned to fit the receiver threads as precisely as possible.

Firearms manufacturers allow themselves some degree of manufacturing tolerances that fall within safe limits for the firearm's function. When rebarreling older firearms, especially those manufactured before the advent of computer-controlled machinery, you must consider how these barrels and receivers were threaded and adjust the fitting of anew barrel to that specific action. This means that the threads will need to be cut into the new barrel shank to accommodate a specific fit.

This can't always be done with a short-chambered barrel, because "you get what you get," and the end result may not be any better than the accuracy achieved by the original barrel with the original chambering. When an action is "custom" chambered, the throat can be cut to a specific length to accommodate a certain length/weight bullet, whereas most factory chambers are cut to accept the longest bullet for that particular chambering.

Conclusions Choosing an aftermarket barrel requires a methodical approach to the selection of barrel steel and type of rifling, as well as close collaboration with the gunsmith chosen to assemble this shooting package. Only after these decisions have been made can you help the customer to choose a good barrel that will suit his needs as well as his budget. I

FROM THE ARCHIVE

The “Accelerated” Firearm Break-In Process

A simple technique used by model airplane enthusiasts can greatly speed up the break-in process for any firearm.

BY CHICK BLOOD MARCH 2007

ORIGINAL PP. 14-15

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Once upon a time I was a model airplane nut. Big time. Seldom have I ever been as happy as when a scaled down Spad 13, SE-5, Sopwith Camel, or Fokker D-7 was buzzing around me while attached to a pair of 60-foot control wires. The hobby served as a great release from monotony for me and a large group of U. S. Air Force guys stationed on the still-battered island of Iwo Jima during the late stages of the Korean War.

Occasionally, just to be different, we'd get hold of a freeflight model with a 6- or 7-foot wing span, build it, bolt on a Japanese-made glow-plug engine, load the model up with as much fuel as it could carry, crank the prop, and turn the whole project loose. Sometimes, it would disappear over Mt. Suribachi. Other times it would vanish toward nearby Ita Jima, off whose shores former President George H. W. Bush ditched his TBF during World War II.

Once, Iwo's Air/Sea Rescue Grumman amphibian radioed in to the control tower to report spotting one of our models 40 miles out at 10,000 feet. The engine had run out of fuel, but there she was, sighted by the entire crew aboard the Grumman. For all I know, that model is still out there somewhere, gliding silently along over the South Pacific. I'd like to think it is anyway. How did we manage to ensure high performance and goose more rpms from what were cheap little engines back then?

The answer is: The Asame way you can work out a rough or overly heavy trigger pull from a rifle, shotgun, or handgun'by breaking them in. Traditionally, with model airplane engines, that could be done by connecting a pint of fuel to the intake and running the engine rich until the pint was empty. That took too much time to suit us, however, and was too expensive. So we connected a regular 2-

THE "ACCELERATED" FIREARM BREAK-IN PROCESS CONTINUED

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ounce tank and let the little mill run rich for 60 seconds. At the end of that time, we'd inject one drop of NOXX-ON' brass polish into the intake. Instantly, the rpms jumped significantly, and continued to increase as we leaned out the fuel/air mixture. Eventually, those little engines would scream like a Formula-1 car moving down along straightaway. The reason for this performance improvement was that the piston and cylinder walls had been polished to a mirror finish by the NOXXON.

What minimal friction remained between them was essentially eliminated by the inherent lubricity of the fuel. Years later, I recalled our "accelerated break-in" technique when faced with a lightly used, but ill-cared-for, 9mm Ruger P-Series. At the time, I was not very familiar with the pistol, but I knew correcting its heavy, rough trigger pull could not be approached as it would be with the familiar M1911. The designs were and are as different as day and night.

I wondered: "Why couldn't I adapt that stepped-up engine break-in process to a firearm?" It would save me (and impatient gun owners) considerable time. Here's how I applied that same technique to the break-in of the P-85: Referring to the schematic, every part identified with an "A" was coated on both sides with

Brownells 555 Gray Polish. Likewise the sear (#25) and hammer (#43) engagement surfaces were coated, along with the sear/hammer pins.

I also coated the contact areas between the trigger (#42), trigger bar (#18), and the bar's frame slots. Then I reassembled the pistol, chambered a snap cap, and began the polishing by repeatedly pulling the trigger. When my finger got sore, the gun was torn down, the gray polish residue cleaned off with solvent, and the parts were blown dry before coating them again, this time with 555 White Polish.

After a second reassembly and multiple pulls of the trigger, I took the pistol down again and cleaned and dried the parts. All the areas that had undergone the treatment wore an ultra-bright finish. Then they were lightly lubricated before being turned back into a reassembled P-Series pistol. Subsequent live-fire testing revealed a pistol with a silky smooth trigger pull that felt much lighter than it had previously.

Time doesn't exactly stand still when applying this accelerated internal polishing/break-in process. It usually takes about an hour per gun, depending on how quickly you're able to disassemble and reassemble the piece. Nevertheless, it's a good deal cheaper and a lot less painful than blowing 500 to 1,000 rounds downrange to accomplish the same thing' although, admittedly, it might not be as much fun.

FROM THE ARCHIVE

Constantly Improving Your Skills

No matter where you're starting from, continuing education is the key to everincreasing success in the gunsmithing biz.

BY ARTHUR J. HUNT MARCH 2007

ORIGINAL PP. 16

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The average gun enthusiast (this is where it all starts) becomes a gunsmith because he has an inherent talent for fixing things and loves to work on guns. This usually happens long before he realizes he can get paid for this kind of work. Actually, "fixing" guns is not where it all starts. To "fix" a gun, you must first know or learn what's wrong with it. This means you must understand actions and the basic fundamentals of operating mechanisms.

You're not going to get this knowledge from a school or correspondence course that teaches handloading, stock-finishing, and ballistics. You have to be able to learn through hands-on experience or factory schools, or possibly through one or two of the better gunsmith schools, to understand the basics of pump guns, autoloaders, doubles, auto-extractors, and so forth. What fundamental similarities do all these have? Where are these fundamentals in the gun that you've been asked to "fix"?

Can you follow the gun's action to the point of trouble? Your ability to bed a stock doesn't help much if you have to hand-make an obsolete extractor. Can you visualize the contours, hand file it from the proper metal, and harden it if required? You can be the best blackpowder shooter in the world, but when it comes time to pull a breech plug or a broken nipple you could be in real trouble if you don't know how. Or should you have to hand-cut a dovetail on a rifle barrel, can you do it so it is straight and tight?

I could go on and on, but what this really boils down to is that there are so many, many situations that you will run into that no one can teach you all there is to know. Assuming you are mechanically inclined,

you have a jump on things. After all, in the America of yesteryear, people had to be mechanically knowledgeable about everything from cars to farm machinery. Some of these repairs or "fixes" were crude by today's standards but they worked.

Let's assume you are mechanically inclined but not a competent parts builder. What do you do? Don't rush out and buy a big lathe and a mill and expect the instruction book to give you the knowledge and ability you need to use these machines correctly and efficiently. Check with your local community college and take a couple of night courses in machine shop. Learn about how a screwdriver is meant to work, how to run a lathe, cut threads, and operate a mill which you probably will never own.

Learn what files are for and study metal-working. As for stock work, get an old Mauser and buy a semi-inletted stock and a selection of tools from Brownells. Butcher one or two of these and then decide if stock-work is for you. Take an old throw-away buttstock and try putting a recoil pad on it. Perhaps I'm going a bit too far in assuming you're just starting out. If you have been in business for awhile, you can still improve your skills by taking these machine-shop courses.

I don't care if you already can run a lathe, believe me you're going to learn something and that something will be well worth the time and the small cost. Taking a machine-shop course takes you out of the "blacksmith shop" and puts you into the gunsmith shop. You must remember, we don't always have access to the technical bulletins put out by the factories, so we have to look to

the "how-to" publications like American Gunsmith and other books and videos for the information we need.

But primarily, we have to build our own book of knowledge that we keep in our heads, and this takes time. You improve your knowledge every time you work on anew or different gun. Look at a Franchi and compare it with an old Remington 11. They both have similar basic functions, but they're different. Keeping the basics in mind, you should be able to follow the functions through and ultimately "fix them" for the better. When you think you're a qualified gunsmith, try taking a Merkle apart.

Look at those European guard screws and when they have set up tight, take the action apart and then make a replacement V-spring. Then put it all back together with no scratches, no bugged screws, and everything lined up right with the engraving. This is a lot different from changing a firing pin or a trigger or whatever in an Iver Johnson single barrel. If you're bent on stock making, take a course in woodworking.

The fundamentals that you will learn about grain, sharpening chisels, and so forth will be most helpful. You'll learn how to make repairs in wood so that you can hardly notice them. You'll be richer for the experience. The last course I would recommend (but certainly not the least) is a welding course. This is just as important as any of the above. You can learn to gas weld well enough to repair very small parts as well as become adept at brazing and silver soldering.

If you are good at arc welding, it will hold you in good stead with bolt operations. After all, arc or electric welding (continued on page 21)

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gives greater penetration over gas welding for jobs like this. You should know how to do both. Once you complete these courses, your metal and woodworking proficiency will be greater than ever before, and you'll be able to make more parts than you were ever able to before. You'll have a whole new understanding of what is "fixable" and what's "unfixable." A good gunsmith should be prepared to manufacture many springs and parts.

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For one thing, you'll be able to make more money, and perhaps you'll be able to repair a gun for which no replacement part is available. By doing this, you'll set yourself apart and ahead of the competition, and the path to your door will become more well worn. One final word of caution on making parts: Know the part, the metal, and the tolerances, for you are creating your own liabilities. I

PEOPLE & COMPANIES

Working the Savage Model 1899 Rifle

Revered by generations of hunters for over 100 years, this popular lever-action came in numerous variations. Fortunately, disassembly and reassembly is similar for all of them.

BY DAVID R. CHICOINE MARCH 2007

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Savage Arms Company introduced the now-famous Model 1899 lever-action rifle in not surprisingly 1899. The new rifle was based on the invention of Arthur W. Savage of Utica, New York. Mr. Savage had previously designed lever-action rifles, one for military trials in 1892 and another, a commercial version in 1895, which was produced for Savage by the Marlin Firearms Company in New Haven, Connecticut. Some 6,000 of the 1895 model were manufactured between 1895 and 1899.

Savage Arms Company was formed in 1897, and began producing the rifle themselves in 1899. The Model 1899 is an outstanding and unique design in many ways. It offered an in-

ternal rotary magazine that held five shots, along with a very strong and simple lever-action operation.

The Model 1899 also incorporated an unusual and thoughtful cartridge-counter feature; the shooter could see the number of cartridges remaining in the magazine by viewing the cartridge counter through a small window on the left side of the receiver. In addition, the new rifle was equipped with a hammer-cocked indicator on the top of the receiver. Another innovative feature was the sliding safety that locked the trigger while at the same time locking the lever in the closed position.

Savage's Model 1899, or the '99, as it was later known, has been popular with hunters since it was first introduced. The rifle has

been available in both solid-frame and takedown versions, and it was the first commercially available rifle to be chambered for a high-velocity .22 cartridge, the .22 Savage Hi-Power in 1912. A year later in 1913, Savage introduced their now-famous .250-3000 cartridge, which pushed a little 87-grain bullet to velocities of just over 3,000 feet per second.

In 1913, this was quite a remarkable feat. Through its many years of production, the company changed many as- Top of page: The Savage 1899 has proven to be a popular choice for several generations of hunters. This rifle is a takedown model in .30-30 Winchester caliber, manufactured in the 1950s. Author photos. Once off, the action parts are exposed for quick disassembly.

WORKING THE SAVAGE MODEL 1899 RIFLE CONTINUED

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They come out after removing the breechbolt. pects of the 1899, although the basic design and operation of this sound and dependable lever-action has remained the same. Thanks to its simple, highly versatile action, the 1899 has been chambered in many calibers over its lifetime, including .25-35, .30- 30, .32-40, .38-55, .22 Hi-Power, .250- 3000, .300 Savage, .303 Savage, .243, .308. and .358 Winchester.

Likewise, the 1899 has been offered in an almost uncountable number of model variations, especially prior to 1981. In the early days, starting in 1909 when the takedown feature was introduced, the 1899 was also offered with auxiliary barrels, often in different calibers and/or barrel lengths. At one time, Savage even offered a .410 shotgun chambering as an auxiliary barrel on some takedown models.

The .410 shells would not feed through the rotary magazine, however, so the shotgun barrel was purely a single-shot affair. Disassembly Instructions The Savage rifle shown here is a 1950svintage Model 99. If you're working on a 99, you may notice some differences between it and the one shown here, since many small changes were made over its long production life.

Nevertheless, if not identical to the ones shown here, the basic components of any 1899 will be very similar. 1.

Before you attempt to handle or work on any firearm, always make it a point to be sure the weapon is unloaded. Hold the rifle around the forearm and barrel, pull the safety lock (#34) back into the "off" position, and push down to open the lever (#41). While you do this, be careful to keep your fingers away from the trigger (#38). Look down into the chamber to make sure it is empty.

You should look into the cartridge carrier (#44) in the action to be sure no cartridges are present on the left side of the action at the magazine spool. It's also possible to view the Savage's cartridge counter through the little window on the left side of the receiver (#2). The counter should read "0." If there are any cartridges present in the magazine, partially close the lever (about half-way), just enough to push the cartridge in the carrier forward slightly and allow it to engage the bolt face.

Then open the lever to expel the cartridge. Repeat this operation as many times as required, until there are no more cartridges and the cartridge counter reads "0." I like to make a habit of removing any live ammunition to a room apart from where I am

working. 2. To remove the buttstock and the fore-end, unscrew and remove the buttplate screws (#55) and you lift off the buttplate (#54). Slide along straight-bladed screwdriver into the hole in the buttstock (not shown) and engage the screw slot of the stock bolt.

Push in hard and unscrew the stock bolt (#33). Once unfastened, the buttstock can be drawn off to the rear of the receiver (#2). Unscrew and remove the fore-end screw (#6) and the fore-end (not shown) will be free to be pulled down off the barrel. For later-model takedown guns, push the takedown latch on the bottom of the fore-end to the rear (on early guns, slide the fore-end latch forward), and tilt the fore-end assembly down off the barrel.

Open the lever and unscrew the barrel by hand in a clockwise direction (looking at it from the rear). 3. Removing the breechbolt begins with unscrewing and removing the breechbolt-stop screw (#29) from inside the lower tang area of the action. Then lift off the breechbolt stop (#30). Right next to the breechbolt stop screw, unscrew and remove the trigger-spring screw (#27) and lift off the trigger spring (#28). Open the lever (#41) and pull it all the way down.

With the breechbolt stop removed, the lever opens farther than normal. While the

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Savage Model 99 Lever-Action Rifle 1 Barrel 2 Receiver
3 Front Sight 4 Barrel Stud 5 Fore-End Escutcheon 6
Fore-End Screw 7 Dummy Screw-Telescope (4) 8
Dummy Screw-Tang (2) 9 Sear Screw 10 Hammer
Indicator Pin 11 Cartridge Guide 12 Cartridge Guide
Pin (2) 13 Extractor 14 Automatic Cutoff 15 Automatic
Cutoff Spring 16 Breechbolt 17 Extractor Pin 18
Hammer Indicator Spring 19 Hammer Indicator 20
Hammer retractor Spring 21 Hammer Bushing Screw
22 Hammer 23 Hammer Bushing 24 Mainspring 25
Firing Pin 26 Firing Pin Securing Pin 27 Trigger Spring

Screw 28 Trigger Spring 29 Breechbolt Stop Screw 30
Breechbolt Stop 31 Trigger Pin 32 Stock Bolt Washer 33
Stock Bolt 34 Lever Lock-Safety 35 Lever Lock Tension
Spring 36 Lever Bushing 37 Lever Lock Pin 38 Trigger
39 Lever Bushing Screw 40 Sear 41 Lever 42 Sear Screw
Nut 43 Carrier Spindle Support 44 Carrier 45 Carrier
Spring 46 Carrier Spindle 47 Carrier Spindle Head 48
Carrier Spindle Nut 49 Rear Sight 50 Rear Sight Step 51
Carrier Spindle Head Screw 52 Pistol Grip Cap 53 Pistol
Grip Cap Screw 54 Buttplate 55 Buttplate Screw (2)

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The sear-screw nut fits in a recess on the opposite side of the action and is not shown in this photo. Notice the steel lug at the rear of the takedown fore-end. This fits into a groove in the bottom of the barrel and in the receiver ring, thus preventing the barrel from turning loose. lever is in this position, the rear of the breechbolt (#16) can now be pushed to the left and then pulled back and out of the receiver. 4.

To remove the trigger, lever, and sear, use a 1/8-inch pin punch and hammer to drive out the trigger pin (#31). The trigger (#38) will then be free and can be removed. Unscrew the lever-bushing screw (#39) and push out the lever bushing (#36). The lever (#41) can now be removed by dropping it out the bottom of the action. Using a special spanner to hold the sear-screw nut (#42), unscrew and remove the sear screw (#9), and lift out the sear (#40).

Be careful that the carrier-spindle support (#43) does not move out of alignment while the sear screw is out. Reassembly tips: Notice that there is a small "lug" or tooth under the head of the lever bushing. This lug must line up with the corresponding notch in the receiver for correct reassembly.

Also, because of the precise adjustment required to re-install the carrier assembly, I don't recommend removing any of the carrier parts unless you're very familiar with the Model 1899 and then only if removal is absolutely necessary. 5. Disassembling the breechbolt (#16) is accomplished by removing the hammer-bushing screw (#21), located at the left rear of the breechbolt. The hammer assembly can now be slowly withdrawn toward the rear. Notice how the hammer-retractor spring fits under the tail of the hammer.

It will fall out as you pull the hammer out of the breechbolt, so make note of its position for reassembly later. 6. Disassembling the hammer (#22) begins by clamping the firing pin securely in the jaws of a padded vise. Hold pressure on the hammer in a forward direction and then use a small pin punch and hammer to drive out the firing-pin securing pin. Then slowly ease off the pressure on the hammer.

At this point, the firing pin (#25), mainspring (#24), and the hammer bushing (#23) are free and can be withdrawn off the front of the hammer. If you need to remove the extractor (#13), use a small pin punch and hammer to drive out the extractor pin (#17). The extractor is then free to be lifted out of the side of the breechbolt. For reassembly, you simply reverse the above procedures. I

GRINDING

Reader Forum

BY AMERICAN GUNSMITH EDITORS MARCH 2007

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Balky Ithaca 12 Gauge I have an Ithaca Model 37-12 gauge. When you work the action holding the gun at port arms, the action locks to the rear and I have to use a mallet to loosen it. When the gun is pointed at the ground, the action works perfectly. Any suggestions as to what I should do to correct this? Generally, the problem you're having with your shotgun can occur with any pump gun.

It's frequently caused by excessive dirt or foreign matter in the slide apertures, by a jammed breechblock, and/or by a jammed slide. Inspect the latter two components for signs of wear or breakage, along with the action bar and its receiver way. The slide stop should also be inspected.

Check to determine if its spring has been bent or improperly installed. (See The NRA Guide to Assembly for Shoulder Arms.) The fact that jarring the gun with a mallet (hopefully rubber or rawhide) corrects the problem temporarily leads us to believe the hangup isn't a major one. If new parts are needed, the company that acquired Ithaca is making the Model 37 and has parts

available. American Arms Takedown I need takedown information for the American Arms Silver II 12 gauge over-and-under shotgun.

The cocking pieces don't cock the hammers completely, and I can't get the mainsprings off of the hammers. Please tell me how to disconnect the mainsprings from the hammers. Thanks. There are a couple of ways to go about this, depending on who made the gun. The first method applies when the mainspring guide rods have holes in their rears. In this case, retracting a directly related hammer slightly will expose the hole.

Placing a short length of small diameter pin (a piece of a paper clip will do) captures the spring in a mildly compressed state and relieves the rod pressure on the hammer somewhat. It is then possible to drift out the hammer-pivot pin for additional disassembly of the action. In some cases, you can grasp the front end of the rod with long-nose pliers, compress the spring further, remove the pin from the rod, and withdraw the spring/rod assembly from the side of the frame.

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A second approach is taken when no hole is present in the rod. Here, smooth-jaw long-nose pliers are required to prevent galling of the rod. The front end of the guide rod is grasped with the pliers, and pushed rearward to compress the spring and relax tension. The hammer is then pushed forward to partially disengage it from the rod, and the rod/ spring assembly is withdrawn from the action. However, it's possible that your problem could be rooted in more than the mainspring and lie elsewhere in the mechanism.

Inspect the cocking lever, cocking-lever rod, cocking-lever spring, both sears, and both sear springs. Three Questions Please give me any information you have on the following questions: The Winchester 1911 shotgun requires two fiber washers in the recoil system; where can I find them, or are there any substitutes for them? Where can I find parts for the Whitney 1886 and the Whitney- Kennedy .44-caliber lever-action rifles, or are there prints available that would allow me to machine these parts?

And finally, can you point me to a parts source for the Martini-Henry Cadet .310 caliber rifle? Thanks in advance for your time and effort. For Winchester 1911 parts, try Pennsylvania Gun Parts The Whitney and Whitney-Kennedy are rare birds and may be worth con-

siderable money in the collector market. For general background on the rifles, contact the Buffalo Bill Historical Center (bbhc.org/firearms/collections.cfm). They may also be able to lead you to working drawings or patent numbers.

Using patent numbers, you can secure copies from the U. S. Patent Office. Patents often contain extensive drawings of the object being patented. If you have some original parts to serve as a scale, you can have the patent drawings enlarged to equal that scale, thereby creating a rough but serviceable guide for making the parts you require. On the other hand, there may be some antique Winchester parts that will interchange with the Whitney parts.

To determine this, call Dixie Gun Works and ask to speak with Jamey Andrews. We can offer no better or more reliable parts-source reference for the Martini-Henry than the American Single Shot Rifle Association (email: or Journal Editor@ ASSRA.com). They can refer you to one of their member-providers. Misfeeding Rossi I have in my shop a Rossi .22 pump rifle that has "Short, Long, LR" stamped on the barrel. I have only tried Long Rifle. It will function if only one shell is put in the magazine.

If more than one shell is in the magazine, it won't lift the shell to put it in the chamber. This Rossi is just like my Taurus Model 62. Charles Griffin Quanah, Texas After receiving your question, we asked whether or not around was fed back from the magazine when it contained more the one round. You replied it fed back but not up. That tells us that something is out of whack or worn in the feeder mechanism. We recommend you replace the feeder, its lever, lever pin, spring, and spring screw.

In other words, the whole works. You must order replacements by serial number. Around the time Tau-

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rus and Rossi (which is now under the wing of Braz Tech) became closely related, there were some dimensional and material-quality changes made in the small-bore trombone rifles. If Taurus made your rifle, they can supply the parts. If Braz-Tech was the prime builder, they're your source for parts. Stevens Trigger Adjustment Regarding your article in the July 06 issue of American Gunsmith, it would appear that the lawyers at Savage/ Stevens have been busy.

There is no trigger-engagement screw in the nose of the trigger. There is not even a hole where you might install one. In addition, the safety screw and trigger-travel screw have some kind of sealer applied to them. My rifle came out of the box with a gritty, creepy trigger pull at 6 pounds. By using Microlon Gun Juice and adjusting the trigger spring, I was able to realize a pull that varies between 4- 1/4 and 4-1/2 pounds. I can go a bit lighter but, I have occasional pulls at 3 3/4 pounds.

The pull is still gritty and creepy but is much better. I am going to adhere to your reminder and keep the pull at 4 pounds and above since this is a hunting rifle. With continued use, the engagement surfaces may smooth themselves out, eliminating the gritty feel. An obvious simple solution to the creep problem would be the installation of a thin steel shim on top of the trigger nose to limit sear engagement.

Since this is a brand new rifle, still under warranty, I think I'll leave it alone for this year and go try to put some venison on the table. On another topic regarding this rifle, those wishing to convert this piece to an inexpensive Scout Rifle will find that the B-Square (#15580) Remington 700 Scout Base is a very nice fit. All you need to do is

drill and tap two holes in the barrel for the forward mounting screws. This mount is available from Brownells.

Again, this will be left until next year when the warranty expires. Should this letter make its way into your publication, I strongly discourage anyone who does not have the proper experience and equipment from trying to drill and tap a rifle barrel. There's no better way to spoil your day than drilling through the sidewall of a barrel and into the bore! We find the absence of a trigger-engagement screw on your rifle more than mystifying. There was one on the rifle we received for the article.

Perhaps a call to Savage regarding the missing part is in order. The sealer on the trigger mechanism you mention is not exclusive to Savage; we've mentioned the presence of such substances on many previous occasions. Nearly all manufacturers use a similar material so factory service people can easily see if the firing mechanism has been tampered with when a gun is returned for service. Note that anything you do to resolve the creep problem should not result in a trigger/sear clearance of less than .015 inch.

Steyr Hahn 1911 Barrels I've been looking for a barrel (or two) for the Steyr Hahn 1911 pistol. I've tried several sources (Gun Parts and some others online) to no avail. I can use any caliber. Thank you. The pistol was introduced for commercial use and soon snapped up by the Austro-Hungarian, Chilean, and Rumanian military. Some were overhauled by the Germans in WWII to fire 9mm Parabellum as opposed to the original 9mm, so choosing "any caliber" may be neither suitable nor safe.

We contacted Steyr Arms in Cum-mins, Georgia, for parts sources. They could suggest none beyond the usual but did men-

tion a web site ([www. Mannlicher-Steyr.com](http://www.Mannlicher-Steyr.com)). Looking further, we found a fax number for a contributing editor to The Standard Catalog of Military Firearms who specializes in Steyr-Mannlicher pistols. Perhaps he can be of more help to you.

Rust Removal Techniques I read Greg Wood's letter in the August 06 issue on repairing water-damaged guns. It seems he is interested in preservation as much as restoration. Here are some techniques I picked up over the course of 30 years collecting and restoring edged weapons: First, it must be understood that iron oxide comes in two basic forms, black and red. Black oxide is called "bluing"; red is called "rust," and there is always black oxide under the rust.

Penetrating oil is the best way to break frozen parts loose, but then how do you remove the rust without removing any of the original finish that's still present (likely more than you think)? The oldest method is to make tools from deer antler. The tines can be sharpened to three or four-sided points, and the main shaft cut into sections. The cut ends are shaped on a bench grinder and used as scrapers to work flat or curved surfaces.

These tools work because antler happens to be harder than rust but softer than bluing. By the way, elk and moose antler work just as well. A modern product that also works is the type of scouring pad made for stainless-steel sinks and cookware. (They look like coiled drill chips.) You need to degrease the parts before trying either of these methods. Another rust-loosening technique that helps when working with small and an email to Chick Blood, Technical Editor, at

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(continued from previous page) er parts is to degrease and boil them in water. Then take them out of the boiling water and place them into a shallow container with just enough water to cover the parts and put them in the freezer overnight. The next day, thaw the parts with hot tap water and, while they're still warm, dry them and continue with the above methods.

For areas where the rust has piled up making lumps, tapping with a small hammer (4 ounce) using very short strokes on the order of 1/4 to 1/2 inch will crush the rust and make it fall away without making dents. CZ 52 Takedown and Cleaning I just bought a BRNO CZ 52 7.62 mm Tokarev pistol, and I don't have a clue how to take down the pistol for cleaning. I especially need to get the barrel out of it, since I intend to shoot a lot of corrosive ammunition through it.

Can you help me out regarding field-stripping of this pistol? Also, I have another question about shooting "corrosive" ammo. Can a clean, non-corrosive cartridge or two be fired behind (or last) after a corrosive-ammo shooting session to clean out the salts and whatever is left behind by the corrosive ammo? Is this a good practice in addition to regular cleaning? How do you clean a barrel that has been used with corrosive ammo? I've heard of the hot-water trick, but is there a solvent that does the job?

It seems to me I heard somewhere long ago that "Shooter's Choice" would do it. Is this true? I'd greatly appreciate your response

to the above questions. James A. Johnson Brookfield, Missouri Complete instructions for disassembly, assembly, and servicing the CZ 52 appeared in the May 04 issue. If you don't have it, reprints are available by calling In answer to your next question: No, a noncorrosive round will have little or no effect on the deposits left behind by corrosive ammo.

The hot-water trick you refer to isn't really a trick. Salts are formed by corrosive ammunition. Oils don't dissolve salts, but hot water and detergent does so quite well. After the barrel has been dried out from the soap and water, any good lubricant' Shooter's Choice among them will serve to protect the barrel until the next batch of corrosive ammunition is run through it. The pistol should always be field stripped and cleaned within hours of shooting any corrosive ammo.

Changing Right-Hand Bolt To Left-Handed Operation I've read about changing right-hand bolt-action rifles to left handed (before lefty actions were made commercially). I think they still eject to the right. I know it wouldn't be cost efficient, but I thought it might be fun to try to make this change just for my own amusement and education. Could you tell me how this is done or where I can find information on this kind of conversion? I have a large-ring Mauser kicking around I thought I'd try it on.

Thank you for any help you can give me. Jay Mc Phetres Sharon, Vermont You are correct, it would not be cost effective. Extensive receiver and bolt modifications

are required. Beyond that, ATF would consider you a manufacturer, and unless you hold a manufacturer's FFL, you could be in a world of trouble if the converted rifle was ever sold.

Nevertheless, to satisfy your curiosity, we suggest you contact the American Custom Gunmakers Guild for the name of a member metalsmith who'd be willing to walk you through the necessary steps. Star PD Takedown I have a Star PD pistol in the shop and am at a loss as to how to remove the rear sight. The pistol was dropped and hit the rear sight blade, causing it to misalign. I don't want to tear into it with a big hammer. Also, if there is a guide or manual that will help me with this gun, where can I get one?

Thanks. A schematic for the pistol appears in Gun Digest's book of exploded handgun drawings. With a drawing in hand, you can see the rear sight is not dovetailed in, but is a blade secured by several adjustment screws. Backing out those screws will free the blade. Hopefully, this is all that has been bent and repairs can be made by replacing the blade. If you don't already have it in your library, purchase a copy of Gun Digest's book of disassembly/reassembly instructions for pistols.

The Star looks a lot like an M1911 and is a wellbuilt gun, but is quite different from "Old Slabsides" internally.

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