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INSIDE THE ARCHIVE

RIB WORK ON DOUBLE SHOTGUNS PRINCIPLES AND PROCEDURES

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ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 009

DIGITAL ARCHIVE EDITION

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RIFLES

NRA Program Aids Disabled Veterans

BY AMERICAN GUNSMITH EDITORS AUGUST 2004

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An innovative NRA program that gained international recognition for its medical application of rifle shooting has begun serving the nation's disabled veterans. On March 25, 2004, a NRA Rehabilitative Shooting Unit was accepted for use at the Brockton, Massachusetts, Veterans Affairs Medical Center, by Ralph Marche, Chief of Voluntary/ Recreation Services for the VA Boston Healthcare System.

The NRA Rehabilitative Shooting Unit was developed in 1994 by Dave Baskin, manager of NRA Disabled Shooting Services, for the purpose of using a precision air rifle as a tool for physical therapists to use in the rehabilitation of their patients. The unit was designed as a comprehensive package, so that each piece of equipment could be used to improve eye-hand coordination, finger function, trunk balance, breath control, concentration skills, and self-confidence.

In addition, the supervising therapist is able to exercise complete control over all safety components and the patient's progress. The program has proven so safe and productive that in 2000 a unit was installed at the National Rehabilitation Hospital in Dublin, in the strict guncontrol nation of Ireland. This NRA program has

not only established rifle shooting as a viable rehabilitation tool, but the in-service seminar conducted for the Brockton Medical Center staff added to the unit's value.

A physical therapy class from nearby Northeastern University attended Baskin's training session to learn the theoretical and practical applications of a rifle in the rehabilitation process. The students learned to operate the unit, and also came away from the session with the knowledge of how rifle shooting is able to make an important contribution to a disabled person's quality of life.

The Brockton facility became the first VA Medical Center and one of 16 hospitals in the United States to adopt this progressive program. This year will mark the 10th anniversary of the installation of the inaugural NRA Rehabilitative Shooting Unit at the Lakeshore Foundation in Birmingham, Alabama. No more-fitting tribute could be paid this revolutionary concept than to have it serve the nation's disabled veterans.

The NRA Rehabilitative Shooting Unit is provided through a matching grant to hospitals that meet all safety and participation requirements. For more information, call NRA Disabled Shooting Services at Editor Keith Lawrence Technical

PEOPLE & COMPANIES

Working with the Marlin T900-Series Small Bore

A totally redesigned trigger system has joined a 50-year-old barrel-making method to produce these new rimfires.

BY CHICK BLOOD AUGUST 2004

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Though not the sole manufacturer, Marlin's reputation for accurate barrels dates to 1875 when it first produced Ballard single-shot rifles. A legend in its time (and still), the rifle was designed and patented (#33,631) by C. H. Ballard. During the Civil War, the U. S. purchased over 1,000 Ballard carbines and discovered they were capable of firing 18 rounds per minute.

In 1864, a patent (#41,166) was awarded to Merwin and Brey for a device allowing the loading of Ballards with either fixed cartridges or powder and ball. J. M. Marlin didn't use this patent on his Ballards. He secured a patent of his own (#159,592) for a reversible firing pin. Prior to 1875, the Ballard was used only with rimfire ammunition. Marlin's patent brought centerfire cartridges into the Ballard arsenal, and the centerfire begat smokeless steel barrels in 1893.

These added a significant safety factor to the mild-steel tubes employed for low-intensity rounds including the blackpowder

cartridges used in the M1893B. The "B" stood for "Blackpowder only," and the stamp "Special Smokeless Steel" is found only on Marlin M1893, M1892, and M27 rifles. All Ballard barrels were made by the cut-rifling process.

In brief, it involved drilling a hole through the center of a steel bar, reaming it out to bore (land) diameter, and pulling a cutter through that was preset to match the twist and caliber. It was slow going, requiring 30 minutes or more just for the rifling. In 1950, Marlin began to test and study Remington barrels that used a technique called "button rifling," known well in Europe and to a lesser degree here. The button method is accomplished by pulling or pushing a hardened swedge through a barrel.

Advantages proved to be uniformity of rifling shape, lengthened tool life, uniformity in bore and groove finish, dimensional uniformity, and reduced time. Barrel rifling took only 2 to 5 seconds! Marlin adopted the button method in 1953. In 1954, the

company introduced its .22-caliber Micro-Groove barrels after perfecting a design for rifling that was eventually patented by T. R. Robinson (#3,100,358).

By 1956, all Marlin barrels carried the Micro-Groove mark, and they carry it today with the exception of cowboy-action models. The latter are still cut-rifled to better serve the soft lead, reduced power loads of the sport. Basically, the Micro-Groove barrel has a plurality of grooves, not cut as deep as broached grooves, and there's little doubt it is the best thing that ever happened to Marlin rimfire bolt rifles.

There's also little doubt the trigger systems on these guns left much to Other models in the 900-Series are tube-fed, while the M15 is a single-shot. All are rimfires and share the same new trigger system.

WORKING WITH THE MARLIN T900-SERIES SMALL BORE CONTINUED

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Original caption: top: This schematic applies to all 900-Series rimfire rifles. Those specific to the Model 925 are identified in sub drawings (A); Model 928 parts are shown in sub drawings (B) and (E); Model 981 in sub drawing (C); and Model 15 in drawing (D). Field Stripping For clip-fed bolt-actions, start with the clip out and the chamber empty. Remove the bolt by raising the cocking lever, pulling the trigger, and drawing the bolt completely to the rear.

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Figure 1. be desired in terms of creep and weight of pull. This older system is shown here in the schematic for the Model 880 (see Figure 1). It's so simple that I've never understood some gunsmith's concerns regarding subjecting it to a "trigger job." The sear (#31) contacts the striker (#33). When the trigger (#45) is pulled, the sear is depressed, releases the striker, and it is propelled forward by the striker spring (#42) to impact the firing pin (#11).

Merely smoothing the sear/striker interface will ease pull and creep. Polishing the striker, its tunnel in the bolt, and the OD of the striker spring will combine to speed up lock time. Marlin engineers have been very aware of the dissatisfaction with the trigger for some time so they've redesigned it for the

T900 series (see the exploded drawing on page 5). The mechanism no longer hangs from a stud at the rear of the receiver as it has since the 1950s and 1960s.

The trigger group is now a unit held to the receiver by a half-dovetail cutout and a single screw. The unit houses the trigger spring, sear spring, sear, safety lever, safety-lever spring, and broke crisply at 3-3/4 pounds out of the box on NRA weights. Below left and When uncocking the bolt for disassembly, the cocking knob is inserted in the receiver and the bolt is turned counterclockwise. After reassembly, the bolt is turned clockwise to cock it prior to reinstallation in the receiver.

OPPOSITE PAGE

Next totally back out the front takedown screw (#59), rear takedown screw (#60), and the trigger-guard screw (#65) in that order. Grasp the stock, lightly rap the barrel upward on a padded work surface, and separate the action from the wood. To prevent damage, do your rapping about 8 to 10 inches back from the muzzle. With tube-fed bolt-actions, first draw out the inner magazine tube. Drift the magazine-ring pin (#36) out in either direction, and pull the outer magazine tube free of the feed throat.

Remove the bolt and stock as with clip-fed models. About the Schematic and Calibers The drawing here is primarily the Model 925 but references all 900- Series models. The differences be-

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Marlin T900-Series Bolt-Action Rimfire Rifle (Specifications subject to change without notice) A B 1: Barrel** 2: Barrel Retaining Pin 3: Breech Bolt Assembly Pin 4: Breech Bolt, Front* 5: Breech Bolt, Rear* 6: Bullseye*** 7: Buttplate/Butt Pad*** 8: Buttplate Screw (2) 9: Cartridge Lifter 10: Cartridge Lifter Base 11: Cartridge Lifter Base Screw 12: Cartridge Lifter and Ejector Spring 13: Cartridge Lifter Pivot Pin 14: Cartridge Lifter Spring 15: Ejector 16: Extractor*** 17: Feed Ramp/Feed Throat 18: Feed Throat Assembly Pin 19: Firing Pin* 20: Firing Pin Spring 21: Front Sight Base 22: Front Sight Base Screw tween the 925 and those models are identified by lettered insets in the schematic.

With the 925, the feed ramp has a D A 23: Front Sight Hood 24: Front Sight Insert 25: Magazine, Complete 26: Magazine Guard Plate 27: Magazine Guard Plate Screw (2) 28: Magazine Guide 29: Magazine Guide/Latch Assembly Pin 30: Magazine Guide Pivot Pin 31: Magazine Guide Screw 32: Magazine Latch 33: Magazine Latch and Ejector 34: Magazine Latch Screw 35: Magazine Mounting Bracket 36: Magazine Mounting Bracket Screw 37: Magazine Tube Band 38: Magazine Tube Band Pin 39: Magazine Tube Inside

Assembly 40: Magazine Tube Outside 41: Rear Sight Assembly 42: Rear Sight Base 43: Rear Sight Base with Elevator 44: Rear Sight Elevator 45: Rear Sight Folding Leaf 46: Receiver** 47: Safety* short nose and is an integral part of the trigger housing.

The feed ramp and cartridge lifter of the 928 are separate (Inset B) and attach to the C E 48: Sear* 49: Sear and Safety Pivot 50: Sear Spring 51: Stock 52: Striker 53: Striker Assembly Pin 54: Striker Cam Bushing 55: Striker Cam Pin 56: Striker Knob 57: Striker Retaining Screw 58: Striker Sleeve 59: Striker Spring 60: Swivel Stud, Front 61: Swivel Stud, Nut 62: Swivel Stud, Rear 63: Takedown Screw, Front 64: Takedown Screw, Rear 65: Takedown Screw, Stud 66: Trigger* 67: Trigger Guard 68: Trigger Guard Screw 69: Trigger Pivot 70: Trigger Spring 71: Trigger Stud** *Restricted availability; qualified gunsmith only. **Factory only. ***Non-restricted.

May require some final fitting. trigger housing, as do the same components of the 981 (D). In the 925, the ejector is integrated with the magazine latch (A), while the 928 ejector is

WORKING WITH THE MARLIN T900-SERIES SMALL BORE CONTINUED

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Care must be taken to avoid fracturing the part during removal and replacement. Located as shown in Inset F. The feedramp E appears only in the singleshot Model 15. The clip-fed 925 is available in .22 Long Rifle only; the 928 tube-fed is .22 Magnum only; and the 981 accepts .22 Short, Long, and Long Rifle. Coming down the pike is chambering for the brand new .17/.22 LR. That's an LR case necked down to .17, and not to be confused with the .17 HMR. The latter may happen later on, too.

Detailed Disassembly The bolt is disassembled by holding onto the rear, and turning the front in either direction to separate the two components. When you raised the handle to remove the bolt, you cocked the bolt. You have to uncock it before further takedown. Insert the striker knob (#52) in the rear of the receiver with the strikercam pin (#51) between the forked slot (see photo). Turn the bolt counterclockwise to uncock it and take the pressure off the striker spring.

Now and not before can you undo the striker-retaining screw (#53) and dump the assembly from the bolt. No additional disassembly

of the Marlin's striker group (#48, 49 and 50) should be undertaken. The extractor (#14) snaps on to the blade farther in between them. When the arms are far enough apart to clear their slots in the bolt, use a finger to push up on the extractor. Once the extractor has been removed, the firing pin (#17) and spring (#18) will drop out.

The pin is restricted because it has a bevel milled to a specified angle at its end. So don't lose it. The Trigger Group Refer to the photos and don't panic, I'm not going to tell you how to take it apart. That's not reality. Reality is when a customer stands across from you with a plastic bag of parts, a sorry expression, and a plea to undo what he has done. The trigger groups for all 900-Series rifles are the same. The only diffrent end of the bolt.

Don't reach for your handydandy pliers to pop it off unless you want to kill it. There's a better, safer way. Insert the flat blade of a screwdriver between the extractor arms. Slowly push them apart by pushing the ferences have already been pointed out in the paragraph on the schematic. Feed throats and

cartridge carriers are caliber-specific. And they merely attach to the trigger housing with a pin or two. Fundamentally, then, the Marlin's trigger group is held together by two identical pins.

The pins are held to the housing by a pair of E-clips. When the customer with the plastic bag disassembled the trigger "to make it work better," he probably lost the clips and the whole mechanism fell apart. Tell him you'll have it "tomorrow," and have a small vise with padded jaws standing by to act as your assistant. Initially, you'll focus on the side of the housing with the squared, milled-out recess. Slip the safety washer on one of the pins. The washer is actually around, wavy-looking spring.

Slip the safety lever on the same pin with the small hole in the lever body facing the front of the housing. Slide the sear into the housing so it protrudes from the top. Align the holes and push the



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The washer under the upper pivot pin is actually a flat, round spring. That's the sear extending above the casting to the right of the safety lever. lever/washer pin through the sear. Secure what you have in the vise, sear upwards. Now press in hard on the pin until you see a groove show up on the opposite side of the housing. Place an E-clip on the curved milled area of the housing, and push the clip into the groove. You may need the help of a screwdriver to do so.

Rotate the safety lever so the small hole extends beyond the base of the housing. Insert the small leg of the safety-lever spring into the small hole from underneath the lever body. Move the lever into a position that lets you readily insert the long leg of the spring into its housing hole. Turn the housing upside down. You should be looking at the underside of the sear. Rest the trigger/searspring on the sear. Examine the trigger. There's a metal, stamped portion to the rear that looks like a tab.

That tab and the trigger/sear spring must meet, then you slide the trigger into the housing. Push the trigger forward a little with your thumb to align the pivot-pin

hole and start in the pin. Move the safety lever a little toward the "safe" position. The lever body has to clear the head of the pin when you push the pin down against the housing. Now release the safety and install the lower E-clip. The trigger assembly has been re-assembled. It is disassembled in reverse.

And if you lose an E-clip in the process, worry not. The clips are standard dimension and can be found at most hardware stores. Final Reassembly Tip When reinstalling the trigger assembly on the receiver, place a dab of grease in the sear-spring hole on the sear. This will aid in keeping the spring (#46) in place. The other end of the spring fits into a hole in the receiver.

Tilt the housing to insert the spring into that hole, push down against the spring, and simultaneously push the dovetail end of the housing into the half-dovetail cut in the bottom of the receiver. Keep pushing down until you're sure the housing is mated with the flat of the dovetail cut, and release the assembly. Spring pressure will retain it while you reinstall the housing screw. That's about all there is to it. But don't forget to give the customer back his plastic bag....

FINISHING

The Bulged Chamber: A Simple Fix

Rebarreling and rechambering are often not practical or possible, but sometimes this simple little procedure will solve a bulged-chamber problem.

BY RAY ORDORICA AUGUST 2004

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It's never fun when we encounter a bulged chamber in an otherwise fully functional rifle. One common "fix" is to replace the barrel, but with unusual rifles this isn't practical, because of special contours, proof marks, or even engraving. Rechambering to something with a fatter case is sometimes possible, but probably seldom as desirable as leaving the rifle in its original chambering.

If your customer brings in a rifle chambered for the .228 Geewhiz Flashbang, chances are he'd probably like to keep the rifle in that chambering. There are, of course, varying stages of bulge. A bad one would probably be sufficient cause to replace the entire barreled action, or even the whole rifle. If it's a truly bad bulge it'll be obvious, with a bulge in the action, and maybe even a burst barrel, and then you've got a real mess.

But often the bulge goes almost unnoticed until the next round is fired and the shooter experiences a sticky case. If this occurs, the common reaction is to assume the load was a hot one and try again. When the same thing happens, the prudent reloader

(reloaders are the ones who are generally troubled with bulged chambers) goes home and loads up a batch of reduced-charge ammo, and tries it again. When this, too, sticks, the shooter figures something is wrong, and will eventually diagnose a bulged chamber.

Another problem is that a shooter may unknowingly buy a used rifle with a bulged chamber, take it to the range, get sticky cases, and not know exactly what's wrong, especially if he's never encountered such a thing before. This is exactly what happened to me with an otherwise fine rifle and, after some ardent head-scratching, I found what the problem was. Even better, I came up with a relatively simple cure that you might find worth a try if you ever come across the problem of a slightly bulged chamber.

Some years back, I bought a 1905 Mannlicher Schoenauer carbine in its original 9x56 MS chambering. I got a few Kynoch loads for it, and when I tried them in the little rifle—which appeared to be in outstanding original condition throughout—he spent cases stuck in the chamber. The Mannlicher Schoenauer has never been

known for its great extraction power, so I didn't think too much of it at first. Some time later, I tried handloads in the carbine.

It has recently been determined (by the Mannlicher Collectors' Association and others) that 1905 M-S carbines and rifles had one of three bore sizes. They were either 0.353", 0.355", or 0.358. Mine was the smallest. I bought some bullets that measured 0.348" (all I could get at the time) and assembled some mild loads. These stuck too. I disassembled the bolt and found a quarter-inch of the firing-pin spring was broken but still in place.

When I removed the broken piece and also cleaned some dried oil from the bolt innards, cocking got a little easier, so I hoped I had solved the problem. But fired cases still stuck in the chamber. I thought perhaps the chamber was rough or pitted, so I gently polished it. Rebarreling would most likely be out of the question, so "fix it" or "don't shoot it" covers the options. This rifle is from the first year of production and is in all-original condition.

THE BULGED CHAMBER: A SIMPLE FIX CONTINUED

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Only the lightest reloads came out easily, indicating a slight but solvable problem. The 9x56 slings 245- to 250-grain bullets at 2,100 fps, a potent round for a 6.5-pound rifle. The chamber cast also provided the solution to the problem. The author sawed off the front portion of the chamber cast, and then turned the front of the remainder down so it would not touch the chamber. He then drilled and tapped the plug to accept along brass rod, making a chamber lap out of the assembly. again, to no avail.

These hopeful attempts to fix the problem took place over several years, during which time I moved, and subsequently lost interest in the little rifle when I could not come up with a solution. Just recently, I made a chamber cast of the Mannlicher, and when I bumped it out of the chamber and measured it, I found there was about half a thousandth of an inch of bulge in the chamber. The first

two-tenths of the chamber was the smallest diameter, and the main body was just a touch larger.

The proverbial light went on over my head, and I got to work. I used the bottom half of the chamber cast that I had just made, cutting it off to about 3/4 inch in length. Then, with my lathe, I turned all but the By bumping the grit-anointed chamber cast into the rear of the chamber, the grit on it cut out the portion of the chamber that was causing sticking cases.

A series of chamber casts would tell the tale more accurately, and would give better feedback on over-cutting the chamber. bottom quarter-inch smaller so the forward portion would not touch the chamber. Then I drilled and tapped an axial hole into the chamber cast to accept a threaded brass rod (an old cleaning rod worked fine) that was long enough to reach through the barrel, out past the muzzle. I screwed the rod into the forward portion of the modified chamber cast.

I then anointed the large portion of the chamber cast with 150-grit valve-lapping compound, and inserted it into the rifle's chamber with the rod protruding out the muzzle. I grabbed the rod with the chuck of my cordless drill and proceeded to lap the last .2 inch of the chamber. That last little bit of the chamber was keeping the very-slightly expanded fired cartridge case stuck in the chamber. I bumped the plug/lap in and out of the chamber as the lap spun, and in short order had removed a bit of metal.

I cleaned it all up and looked, thought about it, and then did a bit more. With everything cleaned up and put back together, it was time to head for the range. This time I had some 250-grain bullets of the correct diameter. These were made by Hawk Bullet Co. after shooters like me asked long and hard to get them. In my experience, Hawk has been very obligcontinued on page 15)

THE BULGED CHAMBER: A SIMPLE FIX CONTINUED

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ing in giving shooters what they need and can't get elsewhere. Imagine my joy when the fired cases nearly fell from the chamber. When this much of the lap had entered the chamber, the author assumed he had done enough lapping. This fixed the slightly bulged chamber perfectly, and restored a superb rifle to healthy status. The dark portion

is what did the work on the chamber. Bolt lift was easy't he first time I'd experienced that since I bought the rifle.

I worked up a series of loads that eventually gave the correct 2,100 fps to 250-grain bullets. Now, after years of worry, doubt, and frustration, I finally had the powerful little carbine I had paid for long ago. My simple lapping operation was a complete success, and very easily accomplished, once I had a

clear picture in mind of what needed to be done. My now quite valuable little Mannlicher carbine is finally in perfect operating order, and best of all, it's still in the original chambering.

So if a customer brings a rifle into your shop with a sticky-case problem' even with light loads't his simple trick might work for you, too. I

MAINTENANCE & REPAIR

Rib Work on Double Shotguns

Principles and Procedures

Knowledge of a few important principles and some inexpensive homemade equipment are all that's required for the proper softsoldering of ribs on double-barrel guns.

BY SERGEY LYALKO AUGUST 2004

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If you do a lot of shotgun work in your shop, there's no way to avoid replacing soft-soldered ribs, which usually is usually referred to simply as "rib work." There are several reasons why this kind of repair continues to be necessary. First, despite numerous warnings, some barrels are being blued in caustic. Soft-solder reacts chemically with this bluing solution and turns into bubbles.

After this operation, the ribs don't usually fall off the barrel immediately, but they'll continue to separate more and more from each shot. Another reason why rib work is often required is because old barrels always are rusting inside the rib-space. This is a result of the natural watercondensing process, which extracts water from the air with changes of temperature and humidity. This rusting goes on underneath the solder, weakening the joint.

There are some ways to partially prevent or slow down this rusting, but nothing is perfect. The third reason for replacing ribs is physical damage to the barrels themselves; for example, if the gun was run over with a car (which I've seen happen). Some of these barrels can be straightened without taking the ribs off, but others require work with each barrel and rib separately. The replacement is needed also when the rib itself was spoiled.

For example, I recall replacing the rib on the smoothbore German double where it was filed and drilled for a homemade scope mount. It looked ugly. Probably the gun was used with a rifled insert. I've seen oth-

er guns that have suffered fire damage and had the ribs become partially unsoldered. The list of causes goes on, but it boils down to a simple fact: The gunsmith should be prepared to properly take ribs off a gun and properly solder them back.

Fortunately, in most cases, loose ribs don't jeopardize the safety of the gun, since the barrels are brazed in the breech with silver which is not affected even with caustic. Moreover, as you know, there are guns without ribs and they have some advantages in terms of lighter weight, better heat dissemination, and less rusting. A strong tradition exists, however, especially in side-by-side designs, and this will help ensure that we continue to see ribs well into the future.

This tradition comes to us from times when ribs were the only connector of barrels on shotguns, rifles, and even pistols. Nowadays, when barrels are connected in breech, ribs are not a mandatory part of the gun; however, they still are important for esthetics, rapid target acquisition, and for attaching sights. In the case of trap guns, high ribs are utilized for reducing the momentum of inertia during recoil. This concept was an important point of Al Ljutic's designs.

Because of the low impact on safety, a loose rib can go unnoticed for quite along time. In my practice, most of the rib problems were detected after a customer's complaint about a loose forend lump, which obviously affects the gun usage and also is an indication of destroyed solder. Reattaching the

forend lump is a good occasion for reattaching ribs, too. One of the major reasons is that without removing ribs it is difficult to properly clean, degrease, and tin the barrel surfaces in contact with the lump.

The other reason is that if the lump becomes loose, then ribs, most probably, also have problems with attachment. In general, rib-soldering is as old as gunmaking itself and takes place in any gun-manufacturing process. Therefore, it's not a technological mystery. The main principle of rib soldering is the uniform heating of the whole assembly of barrels and ribs. Every industrial setup is based on this principle, no matter what the source of heat.

However, there is a big difference between gun manufacturing facilities and a small gunsmithing shop. A gunmaker can invest considerable assets in the rib-soldering process, since this is an important part of gun production. The small shop, on the other hand, may be unprepared for the job. One reason is that the proper setup requires time, money, and space. The other, more important, reason is that not every gunsmith sees the need to provide a special setup for ribsoldering.

I recall one article where the author instructed readers that "this simple procedure" (rib soldering) could be accomplished by pressing the rib to the barrel with a screwdriver in one hand and heating the barrel with torch in another. This is a bad scenario, but many still do it. So, what's the problem with this approach? The short

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answer is “warping”; you can’t avoid barrel warping when soldering ribs this way. The other concern with this technique is the quality of the joint itself. I’ll address warping and quality first, since only with an understanding of these issues can we make the right decisions, and then I’ll review my setup for rib work. The important part of this setup is an affordable stand and a set of clamps.

When constructing these devices, I had two goals in mind: one, to create a setup capable of doing high-quality rib work; and second, to achieve simplicity and the lowest price possible. The principle of these clamps is not new; I used similar clamps in Europe along time ago. The same type of clamps were presented by William J. Nittler of San Francisco in a publication of the American Custom Gunsmithing Guild. In these cases, however, the clamps were expensive to make and quite cumbersome.

Therefore I paid special attention to creating clamps that were light and cheap. Heating barrels from inside with oxyacetylene or a propane-air fork, as I do it, has also been in use for quite awhile. The new feature of my setup is a stand that allows the barrels to be rotated during heating and soldering. All of these devices will be described in detail in later sections.

I hope that the importance of the principles I’ve mentioned and the simplicity of the equipment I’ll recommend will convince advocates of the “screwdriver and torch” method to review their technology. Thermal Expansion As a Source of Warping Let’s suppose you’re taking the ribs off a double shotgun by putting the lump in a vise and

heating the top rib with a torch. The torch is providing localized heat, so you would try to move it along the barrel in order to unsolder a longer piece of rib.

It is inevitable that, for part of the time, the temperature of the top rib is higher than the temperature of the bottom rib on the opposite side of the barrels. As a result, the top rib becomes longer than the length of the bottom one. Figure 1. Principles of Barrels Warping. What happens to the barrels at this point? They bend toward the shorter rib. The extent of the bend will be different depending on the difference between the temperatures of the ribs, the area heated, and so on.

What’s important is that this bend does not go back to its previous shape, unless the bend is very small. Let’s make a simple calculation to roughly estimate the damage. Assume that ribs are attached with 50/50 solder, which means that it is an alloy of tin and lead in equal proportions. With certain variations, it melts at 450 degrees F. Assume that the length of barrels is 30 inches (760 mm) and the difference in temperature between top and bottom ribs is 212 degrees F (or 100 degrees C).

Then the change in length can be derived from a simple formula: Length Change = Original Length $\times$ α $\times$ Temperature Change, where α is the coefficient of expansion (for steel, this is equal to 13×10^{-6} /degrees C). In our case, the length change = $760 \text{ mm} \times 3 \times 10^{-6} \times 100 = 0.988 \text{ mm}$; in other words, the top rib becomes about 1mm longer than the bottom one. One millimeter doesn’t sound like much,

but remember that the bottom rib is placed close to the top one, which makes the whole thing act as a bimetallic pair.

Assuming that the distance between ribs is about 10 mm, we can easily estimate that the bend in our case has a radius of 7610 mm (7.6 m). That’s a pretty good bend. Figure 1 shows a schematic of bent barrels and the formula for estimating the radius of the bend. Decreasing the difference in temperature between the top and bottom ribs will decrease the bend. For example, a difference of 50 degrees F will yield a length change of only 0.25 mm, which in turn yields a radius of about 30 meters.

Soldering ribs back onto barrels sometimes creates an even worse situation, because of the practice of keeping one of the ribs immersed in water (or cooled some other way) while the other one is being soldered. Then the difference between rib temperatures is much greater, consequently, the bend is greater. In practice, the torch creates multiple areas of uneven heat and therefore numerous areas of uneven expansion.

This brings us to the main principle of rib-work: Minimize the temperature difference between parts of the rib-barrel assembly. Of course, in practice it’s almost impossible to heat all parts of this assembly to exactly the same temperature. The important point of this is that we can’t ignore the local application of the torch, but we must try to heat the surrounding area to approximately the same temperature to eliminate the risk of warping.

The better the setup, the less difference in temperatures between parts of the assem-

RIB WORK ON DOUBLE SHOTGUNS PRINCIPLES AND PROCEDURES CONTINUED

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Figure 2. bly, which will result in better quality work. Testing the Quality Of a Rib-Barrel Joint There are two times when the quality of the ribs-barrel joint needs to be tested. First, when you've just finished the job and want to be sure that it has been done successfully. And second, whenever you suspect that there may be a problem with the joint. Testing is a good way to reduce the chance of a rib falling off in the field.

Even more importantly, you can prevent customer-made fixes such as bonding ribs with epoxy, tape or worse with a screw through the top and bottom ribs. I'm sure you've seen these cases. So, how do you check the quality of the rib joint? One of the oldest methods is to "ring" the barrels. You do this by hanging the barrels with the hinge lug over your index finger and lightly tapping it with a wood-en block. Normally, the barrels will ring.

If the sound is crystal clean, the joint is assumed to be good. (Usually before this test you have to remove ejectors, swivels, and other moving parts.) If the ringing sound is accompanied by rattles and jingles, then you have a problem. Take into account that the sound is associated with the area adjacent to the strike, so you have to tap the barrels in several different places. How good is this test? It definitely gives us a status check on the rib-joint, and is able to detect severe splits.

But I still like to run an additional test. Wet the barrels with soapy water or even immerse them in the water. Direct air from the compressor into the small hole which is usually drilled in the bottom rib under the forend. (If there is no hole, drill one yourself, since this

is useful for equalizing pressure, oiling, and cleaning the ribspace.) Watch the areas along the rib borders. If multiple bubbles of air appear from underneath the ribs, then there are some splits.

The more areas with bubbles you can see, the more splits you have and the weaker the attachment of rib. Interestingly, even after a successful ring-test, you still can find splits with the bubble-test. Figure 2 shows such bubbles, despite the fact that this gun originally came to me with only a complaint of a loose forend lug. So what do we consider a good rib attachment? Are any splits acceptable?

Ideally, the joint should not have any splits, but I think that about 5 percent of splits may be acceptable, meaning that about 95 percent of the rib length is attached properly. For example, the 30-inch barrel has 120 inches of rib-barrel joints. I would accept the rib-work with 6 inches of splits in total, as long as the splits are not at the front and back ends. It also should give a successful ring test; but keep in mind that only the bubble test can show the length of damaged joint.

After rejoining barrels, it's important to check them for straightness. Despite everything we do to prevent warping, it may happen. Therefore rib-work is not complete until you make sure that, along with proper joints, the barrels are perfectly straight. This check is usually done with shadow rings in the bore. This test is well known, and therefore I won't go into it here. But, of course, in severe cases of warping, the rib-work has to be redone. Figure 3. Figure 4.

Tools and Procedures The quality of the rib-barrel joint does not happen by itself, regardless of the procedure used. The gunsmith has to provide correct preparation and an adequate test of quality. Let's review the most important elements of ribwork and their influence on its quality. Uniform Heating. Heating wire-secured barrels and ribs in the forge proved itself over the centuries. This process is still in use.

Some other setups in smaller gunsmithing shops heat barrels in along pipe or with gas heaters used for bluing. All these methods are external, meaning that the surface of the barrels is subjected to flame. One of the disadvantages of this approach is that, after putting the assembly into the flame, you have no control over it. So, if during melting of the solder the rib moves or tilts it can't be corrected immediately.

The other disadvantage of external heating is that an open flame makes barrels dirty with burned flux and ash. It hides small defects until the complete cleaning of the finished job. Therefore, my choice is to heat the barrel-rib assembly from inside. In combination with the clamps I'll describe here, this method is quite simple. The heater-fork is shown in Figure 3. I made mine so that the distance between the two burners allows inserting barrels of 12-, 16-, or 20-gauge.

The burners are 35 inches long, and for greater rigidity they are made of stainless steel. The mixer and two removable #2 tips are standard for an oxyacetylene setup. This heater is cheap and easy to make. Some providers of welding equipment sell fork-

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heaters for general use, but I've found them to be inconvenient and quite expensive. The usual oxyacetylene mix can be used with this heater, but because of the high temperatures oxyacetylene produces, the better choice may be an air/propane mix, which gives milder temperatures. Normally the string of medium flame will go through the barrel from the chamber to the muzzle. However this flamestring has different temperatures at different points. Therefore, the heater has to be constantly moved along the barrels.

The heavier part at the breech takes more heating time than the thinner part at the muzzle. It's relatively easy to watch the melting solder and properly adjust the location of the flame during both the removal and the soldering of ribs. Holding Ribs and Barrels Together. Internal heating has the advantage of leaving the barrel's surface exposed to the gunsmith during the whole soldering or unsoldering procedure. It also allows the use of clamps more sophisticated than just wire.

There are three requirements for clamps that I've found to be important. First, clamps should provide constant pressure on ribs and barrels during the expansion and contraction of the metal. This means that clamps should be spring-loaded; rigid clamps will leave dents on the barrel walls during cross-expansion. Second, they should enable control over each rib independently. For example, if you have to replace only one rib, the other rib should be held by the clamps during heating and replacing the first one.

Third, the clamps should maintain a proper distance between the barrels relative to each other. In some cases, when only the ribs are under pressure, they move when melting the solder and change the relative position of the barrels. All these requirements can be satisfied with the four-way, spring-loaded clamps shown in Figure 4. It took meawhile to find a really cheap way to produce them. My search was concentrated on finding cheap parts, which might be easily assembled into a clamp.

This is assembled entirely with parts of lighting hardware shown separately in Figure 5. Every part can be purchased for about 50 to 80 cents each in any hardware store. Plungers 3 are turned from large nails on a lathe. Parts Bare brazed into the square frame C. Springs 5 should be quite strong. I have used old hammer springs. Angles 1 are of steel with the hole threaded to 5 mm. Round handles 6 are held on the tube 8 by a small pin 7.

The plug 4 is important as it allows free floating of the plunger while tightening and releasing tension. Without it, the plunger could rotate and scratch the rib or barrel. Shown in Figure 5-A is the plunger with the angle attached. The other type of plunger is of the same shape, just without the angle. Figure 6 shows the clamps installed on the barrels. You may notice some compression of the springs as the plungers are tightened onto the tubes. Some guns require replacement of only one rib.

Figure 7 shows installation of the top rib while the bottom one is held by the set of clamps. Use as many clamps as you feel you need. I usually apply four or five. The fixtures shown in Figures 8 and 9 allow rota-

tion of the barrel assembly at any time during soldering or rib removal. With their help, you can reach any spot on the assembly for control or corrections. They also allow the local application of a torch after the barrels are preheated to the approximate melting temperature of the solder.

The front portion consists of two tubes and is spring-loaded. These tubes hold the ends of the barrels together and allow the flame to escape. The spring pushes the assembly toward the rear fixture, holding it in any chosen position. At the rear, the barrels are held by the rod 2, which also serves as a handle for rotating the assembly. The rod is engaged with the bolt recess on the barrel lump. The round shape of the rear fixture allows rotation and provides access into the barrels for the heating fork.

To some extent, this setup is similar to a checkering cradle, where rotation is also a necessary element. Thorough Cleaning. This is no different from any other soldering job. Simple logic tells us that solder does not adhere to a dirty metal surface. Proper Fluxing. Flux improves solder adhesion by chemically cleaning the metal surface and preventing oxidation. Choosing Solder. Today's market is full of options, but not every soft solder is good for ribwork.

You must take into account the strength in psi (pound per square inch) of the solder of your choice. Here are some examples: Hi Force 44 solder, available through Brownells, melts at 475 degrees F and has a strength of 28,000 psi. The SWIF 95 solder and flux flows at 465 degrees F and has a strength of 10,000 psi. The old 50/50 has about 6,000 psi and requires 450 Figure 5.

RIB WORK ON DOUBLE SHOTGUNS PRINCIPLES AND PROCEDURES CONTINUED

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degrees F, while TIX soft solder yields only about 4,000 psi but melts at 275 degrees F. Needless to say, softer solders have lower melting temperatures; this convenient feature doesn't necessarily make them ideal for our purposes. TIX, for example, melts at roughly half the temperature of SWIF 95, but TIX is too soft for ribs on shotguns or doubles, while SWIF 95 is one of the best for this purpose. Fitting Surfaces. Adjacent surfaces should have the smallest gaps possible.

With big gaps, the solder will almost always have cavities and voids which will reduce the strength of the joint. Figure 10 shows the surface of the forend lug slot after the lug fell off the barrels. As you can see, the cavities in the solder significantly reduced the holding area. Tinning Surfaces. Tinning is the pre-Figure 8. Figure 9. Figure 6. liminary heating and covering of both surfaces with solder.

The reasoning behind tinning is that adherence of solder to ferrous metal is much more difficult to achieve than adherence between similar solder compounds. To avoid warping, tinning should be done on preheated barrels. I do my tinning with SWIF 95 solder & flux paste. It can be conveniently applied with a brush and prevents solder drops into the rib-space. It's important to avoid these drops, as later they may remain in the rib-space as free pellets, which roll with every move of the gun, making unpleasant noise.

Barrel Leveling and Spacing. Before putting the ribs back on the barrels some obvious preparations should be done. First, the barrels should be straightened. Second, they should be spaced and leveled. Straightening or bending barrels is an advanced gunsmithing technique, which I won't discuss here. In terms of spacing, shotgun barrels

usually have a tight contact at the muzzle end. One or two spacers should be placed at one-third and two-thirds of the barrels' length.

These spacers help to keep the barrels in position during soldering. I like to attach the spacers with stronger solder or even silver. Needless to say, the soldering of spacers should also be done on preheated barrels. Finally, leveling ensures that barrels are parallel horizontally. Figure 11 shows the leveling process. All metal rulers on the barrels surfaces should be parallel. You also may notice the spacer installed between the barrels. Live-Fire Testing.

After soldering the ribs back on the barrels, you obviously have to blue them. Don't rush with this last step. First, pattern the barrels



Figure 10. Figure 11. with live ammo. The pattern may show you that the point of impact is not where it should be, which means that the rib-work needs corrections. The other advantage of live shooting is that it will

split the ribs from barrels if the soldering was insufficient. After shooting, check the joint with both ring and bubble tests.

Conclusions Replacing ribs on the double shotgun is a relatively advanced gunsmithing job which requires an understanding of the

heating/cooling process, as well as the application of the appropriate equipment. Uniform heating is the most important principle of ribwork, but fortunately the equipment needed for a high-quality job is relatively inexpensive and easy to make. I

MAINTENANCE & REPAIR

Repairing the Colt Service Model Ace/Conversion Unit Magazine

With a little ingenuity and an old machine screw, those plastic magazine followers can be made to last forever.

BY KEN WINDELER AUGUST 2004

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The Series-70 Colt Service Model Ace is a Government Model Pistol that resembles the Gold Cup in profile, but is chambered for the .22 Long Rifle cartridge. The Service Model traces its beginnings back to the late 1930s, and is actually nothing more than the .22 conversion unit installed on a Government Model .45 receiver, and marketed as a separate model. The original Colt ACE was a straight blowback design that proved to function unreliably.

This problem was overcome by David Williams, who designed the floating chamber that provided enough momentum to operate the lightened but still big slide of the GM pistol. Williams would later become famous for his association with the development of the U. S. M-1 Carbine. The Ace Magazine Having purchased a Colt Service Model Ace .22 Long Rifle semi-automatic pistol, it was only natural to purchase an extra magazine.

These magazines have removable floorplates, recessed sides, magazine body fillers, and a steep price tag. Decent Government Model

mags sell new for between \$20 and \$30. When I purchased my spare Colt ACE magazine, they sold for about \$40, but new Colt ACE or conversion-unit magazines now sell for as much as \$65. 22 pistol is essentially a Colt .22 LR conversion unit assembled on a Government Model frame.

These magazines can be completely disassembled, and consist of a removable floor plate, floor-plate retainer, the body, a body filler, spring, spring base, follower, and follower stud. The cartridge followers on these magazines are made of a black synthetic

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plastic'probably nylon. The Colt factory mags are very nice and work quite well. Failure to Lock the Slide Open With the low cost of .22 LR ammunition, I put a lot of rounds through my Service Model Pistol. The way the magazines are made, the follower projection that engages the slide stop can rub on the mag body. I don't know if this caused one of my magazines to fail or not, but eventually the follower failed to lock open the slide after the last shot.

I like to have a spare magazine for a semi-automatic pistol, and prefer two. Now what was I to do with a magazine that would cost \$65 to replace because it needed a 75-cent part. I tried an aftermarket magazine. The left follower is the one that was repaired and the hole for the machine screw can be seen. On the far left is the modified screw insert. The right follower is in original condition. that was not up to standard. Although it worked reasonably well, the feel and finish just weren't there.

The only good solution to the problem was to fix that Colt magazine. A Permanent Fix At first I thought about making an alu-

minum follower or trying some epoxy to fix the very small area. But then I came up with a better idea. Why not install a screw into the magazine follower, and fix it for good? After I convinced myself that this would work, I found a 4-48 slotted fillister-head machine screw (an old revolver grip screw) that should do the job. I disassembled the magazine and put the follower in a small vise.

With a rotary tool, I cut into the follower just enough to drill a hole into it. Then I carefully drilled a #42 hole in the follower, being certain that the screw slot would be even with or higher than the ledge that activates the slide stop. The next step was to tap the hole. After tapping the hole, I inserted the screw and used the rotary tool to relieve enough plastic for the screwhead to fit, and screwed the screw into the follower until the slot was level.

Since the screw projected out the other side, it had to be shortened. I marked which side of the screwhead was up, removed the screw, and with the Dremel cut-off disk I cut off that half of the screw head.

When cutting off the screw head, I cut into the screw body and made a small slot for a small screwdriver. Finally, I reinstalled the screw and then shaped the remaining part of the screw head to blend into the leftover portion of the original follower projection.

At first the flat surface was a bit too high so I continued trimming until it worked perfectly. Conclusions This took a little while to do the first time, but it was a whole lot cheaper than anew magazine. And besides, this one is fixed; if I'd bought anew magazine, it would eventually have suffered from the same problem. With a steel insert in that plastic magazine follower there should be no worries about repairing it again. One of these days I'll repair my other magazines.

At least the next time, I can spend more time doing and less time thinking and planning. I

PEOPLE & COMPANIES

Nuances of the Italian Single-Action Revolver

Modern variations of the SAA abound, but all can be improved with similar techniques and aftermarket parts.

BY ROBERT K. CAMPBELL AUGUST 2004

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Some of my favorite movies were made in Italy and lately I've come to appreciate the singleaction handguns made in Italy as well. Marketed under the Cimarron, Beretta, and Navy Arms logo, these revolvers are Uberti all the way. There are nuances of the design, however, that are well worth exploring. There are no less than four safety systems to be found, for example, including two in current production.

This means that the gunsmith undertaking a smoothing-up of the Uberti action must be aware of the differences in the revolvers. And although some of the general rules apply to them all, when ordering parts you must be sure of the exact model you're working on. As I mentioned, I've encountered four different types of safeties on Uberti revolvers, but there may be more. Since foreign-made single-actions are often required to have some type of safety, this is to be expected.

The original guns are pure Colt SAA with no additional safety. These guns must be carried with five rounds loaded and the hammer down on an empty chamber. A variation I have seen on older guns is a knurled dial on the hammer that is turned forward when the gun is fully loaded. This component should keep the hammer from touching the cartridge, but I personally don't care for this safety and wouldn't trust it. The Navy Arms Deluxe pistol has a small block in the hammer.

When the gun is loaded and the hammer fully down, the hammer is eased back slightly until it clicks and this block is activated. It will not let the hammer touch the cartridge. This is a good system for those who prefer the traditional hammer-mounted firing pin. Another safety I've seen is the transfer-bar system used in the new Beretta Stampede-type revolvers.

Along with Though well-designed, the author still prefers leaving an empty chamber under the hammer. the Colt Cowboy, this is the only type of replica revolver that I believe is truly safe to carry fully loaded. Unlike the modern Ruger revolvers which have a proven safety system, the Stampede operates like the Colt Single Action Army. There is a half-cock notch and the loading gate is opened with the gun on half cock. The Ruger can only be opened when the hammer is fully down.

In my opinion, for anyone who wants to own an authentic cowboy gun with good safety features, the modern Ubertis offer an excellent compromise. Nevertheless, for real peace of mind, it's still a good idea to carry five rounds in the chamber and lower the hammer on an empty chamber. There are several problems with the SAA-clone guns that sometimes have to be addressed. Sight regulation is one, though the modern guns seem

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better in this regard than those of the past. And I still see revolvers that experience cylinder binding. But probably the common complaint is a lousy trigger action. Some of these guns have very nice trigger actions but, by and large, the factory Ubertis can benefit from a little improvement, so let's look at the best means of smoothing a trigger. Remember, above all else, a trigger action must be safe.

A too-light trigger can be a danger to all involved, and if the job is botched, only a complete overhaul with new parts will cure the problem. My old friend Leroy Ray once told me the majority of single actions that came into his shop had been "played with more than shot." That's probably still true, especially with all the practice that takes place for cowboy-action events. When working on these guns, I'm glad I have the Chapman screwdriver set with which to remove the backstrap.

I take the screws loose in tandem, working one a bit and then the other a turn or two, until they are all out (and returning them in the same fashion). When the screws are

out, the backstrap will not fall away. Usually, it must be gently tilted and rocked off the frame. Care must be taken in polishing these parts, as angles can easily be ruined. It's a good idea to have a clean light-colored mat under the gun for the next procedure.

With the backstrap placed to the side, loosen the hammer-spring retaining screw, and rock the hammer spring from under the hammer. Lay the hammer spring and screw aside. (You will regret it if you lose these screws.) Remove the screws holding the trigger guard to the frame, and remove the trigger guard. You will now begin to see some of the subtle and not-sosubtle differences in these pistols. Late-production pistols have a hand and spring that resembles the Ruger.

I've read about a test in which a Navy Arms revolver was cycled 40,000 times in a special machine. The old guns would never have survived the equivalent of 800 boxes of ammunition or a lot of playing fast draw. The Colt SAA-style was not as rugged. Considering the amount of money shooters

have spent trying to make a Ruger handle like a Colt and a Colt last as long as a Ruger, Uberti has done a good job with the modern upgrades. Older models, however, are more Coltlike.

Next, remove the hammer screw and take the hammer out of the bottom of the receiver. The cylinder hand will usually fall out at this time. Carefully look at the position of the trigger spring, remove its retaining screw, and slide the trigger spring out. Now the hammer spring and trigger spring can be replaced with W. C. Wolff springs that allow a better, lighter trigger. They really make this an outstanding factory gun, and we can do the same with even older-model Ubertis.

It is possible to lighten the factory springs, but I admit to having little experience with the process. Basically, you must grind and polish the spring to a thinner contour, reinstall it, try the action, and perhaps try again. I'm sure there are gunsmiths who can knock this job out quickly, but I'll use the W. C. Wolff springs.

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The trigger spring can be addressed as well, but again I prefer to replace the main spring and hammer spring in my guns with W. C. Wolff units. I have done some hammer work on single-actions, and what I say next may be considered controversial by some. In several of the old-style revolvers with the odd-ball knurled safety in the hammer, I removed this safety. Often, it became loose and moved to the safe position on its own, preventing the gun from firing.

Since the gun should be carried with five rounds only, I considered this to be safe enough in my hands. I would, however, replace the entire hammer on a customer's gun. The modern hammer blocks may work or they may not; and as someone once said, it's a shame to buy any new gun that may fire when dropped. Still, I carry even my Rugers with five rounds in the chamber. And I would never modify an unbroken safety device.

When working with the Ubertis, I've found that polishing the bearing surfaces of the hammer can sometimes improve the smoothness of action. In older production, the hammer surfaces were often the very roughest part of the gun. Hidden from view, they were seldom well finished. Just remove the burrs and high spots, being

careful not to change the angles of the hammer. Here we can get into trouble, and here we can achieve smoothness with a little finesse.

This type of problem can be addressed by careful stoning and polishing. I well remember an article I read on the single-action revolver some 30 years ago. The writer was testing a revolver that had been brought to him for a checkup. Someone had butchered the action, but the author of the article didn't know that. He cocked the gun to test the action, and before he could bring it up to firing level, the gun went off and blew the toe of his boot off!

You may have heard of the "slip gun"—a single-action revolver that was meant to be "slipped" and fired. The gun was fanned and fired as soon as the hammer was released, without benefit of pulling the trigger. I don't know if any real gunfighters used them; I seriously doubt they would. What probably happened is that excess wear or a gun butcher put the gun into this shape. I had an early German single-action, a Herbert Schmidt, that became a slip gun. Don't laugh, I enjoyed that gun very much.

It had a heavy barrel and was quite accurate. But the metal in the hammer left much to be desired. So, anyway, polish

lightly—and don't change the hammer angles! Poorly fitted guns become poorer with shooting, and you can often prevent eccentric wear by polishing the hammer. There are those who recommend placing a small leather shim or pad to shim the hammer spring out a bit from the frame. The theory is that this reduces the severe angle of the spring, and makes for longer spring life.

I honestly can't swear to the effects of this modification, but I have done it and the gun did seem to have a lighter trigger action afterwards. Trigger actions can be subjective, of course, but you're just playing unless you invest in a trigger-pull gauge. The best all-around unit I've found is made by RCBS and is available from Brownells. And it is inexpensive. There are other variations of the Uberti, including blackpowder styles and the Remington versions.

All have undergone considerable tightening of the internal specifications, and fit and finish are better than ever. While they differ in details, all will respond to the same basic procedures. I've worked with many, and key steps in polishing and fitting are the same. The final step is always the same—reassemble the gun and have some fun. I

RIFLES

Reader Forum

BY AMERICAN GUNSMITH EDITORS AUGUST 2004

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Trigger-Pull Adjustment I recently bought myself a lighter rifle, but its trigger pull is heavy. It goes way over my 72-ounce scale, so it must be 5-6 pounds. Breaking the rifle down and looking at the trigger, I find two screws sealed with wax or threadlocker. I'm wondering if you can tell me if this is an adjustable trigger, and, if so, how to adjust it? I installed a Timney trigger on my Mauser 98 and know the top screw is the trigger-pull adjustment. Or would I be better off to order another Timney for the 700?

Also, I see in the index that there was an article in the April 1997 issue titled "Modifying a Trigger to Suit the Shooter." Would this be of any help? (I started my subscription in 2000.) Thanks for any advice and help. Both screws are sealed with epoxy to discourage tampering. The lower screw can be turned counter-clockwise to reduce the pull. The upper screw is for travel adjustment. Turn it clockwise until the action won't release when the trigger is pulled.

Then hold the trigger back and begin turning the screw clockwise until the sear releases. Yes, you'd be better off with another Timney for all the reasons stated regarding trigger work in the June 2001 issue. Star Model

B Parts? I'm interested in information on the Star automatic Model Bparts list. Specifically, I'm looking for an extractor, but I would like to have the complete parts list and complete breakdown of the automatic. I would also like to know where I can get parts for it. Thanks.

There are schematics for the Star Model Bin Gun Digest's book of exploded handgun drawings. The pistol is a Spanish-made variant of the M1911-A1, with a different lockwork and without a grip safety. There are no detailed take-down references for the Model Bin our files, but the Model BS is well covered in the NRA Guide to Firearms Assembly, combined shoulder arms/handgun edition.

Some parts for the Model Bare available from M&M Gunsmithing Firing-Pin Protrusion I'm wondering if you can provide some info and advice. I just put a firing pin in the bolt assembly of a Mosin-Nagant. The firing protrusion as is measures out at 0.091 inch (cocking piece down). It's my understanding that protrusions for centerfires run anywhere in the range of 0.060 to 0.075 inch. Are protrusions for Mosin- Nagants normally this large?

READER FORUM CONTINUED

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Since I've been told that all firing pins for Mosin-Nagants are the same, and this one is as it came from the supplier, I'm wondering if I should take the pin down to 0.075 inch. Mike's Gun Repair Haliburton, ON, Canada The protrusion is excessive. It may be that the newly installed firing pin is too long or simply that it has been screwed in too much. Back it out so the protrusion measures .074 inch. Sticky Remington I have an 1100 on which the gaspiston assembly was broken and the link was damaged.

I've replaced them along with the action spring. Now the action is slow to return; sometimes it needs assistance. If I take out the firecontrol assembly, it works fine. I used a fire control out of another one and it works fine. Some ideas please. I also have an 11-87 that short cycles. I cleaned the action, and now it doesn't cycle at all. Thanks. On the 1100, the action bar is probably binding on the fire-control assembly (also known as the trigger mechanism) but not on the others you have tried.

Mark the trigger housing with Dykem, assemble the shotgun, cycle the action, disassemble, and check to see where the contact is taking place and relieve the area. We doubt the action bar is bent since it works with the

substitute assemblies you've tried. On the 11-87, are the piston and Oring assembled incorrectly? Check the owner's manual. Also, the Remington 11-87 barrel is designed to allow the interchange of 2-3/4- and 3-inch field loads. It will short cycle with target loads.

A Different S&W Attached are pictures of the inside of what appears to be a Smith & Wesson Model 10, except that it has four screws instead of the usual three or five. It has a top-plate screw, but no screw on the front of the trigger for the cylinder stop. Upon opening, the design is different from any other S&W that I've ever seen. The cylinder stop and the trigger are made differently, and the rebound slide has a leaf spring attached to the front of the grip that actuates it. My first question is: What is this?

And, second: Where can I get parts, as there is a nipple that sticks up on the cylinder stop that appears to have part of it broken off. Thanks for your help. The pictures are too close up for us to identify it precisely, and you did not specify caliber so we'll assume it's a .38 or a 32-20, which shared the same frame size. This revolver is among some of the first side-swing revolvers that S&W made, and it predates the Model 10 by about 60 years.

FROM THE ORIGINAL PAGE

It is either a Model 1899 (.38 Hand Ejector First Model) or a Model 1902 (.38 Hand Ejector Second Model). You can identify the specific model easily, because the 1899 has no extractor-rod lug under the barrel, while the 1902 does. The two guns use triggers and cylinder stops that are identical. The little nipple on the cylinder stop is its cam, which is simply a tiny, hardened, spring-loaded plunger with an angle

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ground onto its face. Parts for this gun might be available from Jack First Gun Parts or from Numrich Gun Parts Corp. Remington 788 Parts In reference to the article in January 1998 ("Remington 788 Part Sources"), I am in need of a 6mm Rem clip for a 788. Also, I have another customer with a bolt handle not properly rewelded. You recommended Chuck Lutz and I sent him a letter but my letter to him came back as undeliverable. Also, I struck out on the phone.

I would appreciate help in locating him if he is still around, or perhaps you could recommend someone else. Thank you for your help. If Pennsylvania Gun Parts can't supply the clip, try Tom Forrest Mr. Lutz is a member of the Custom Gunmaker's Guild Contact them for an update on his address. AR Drawings Do you know where I might be able to get a dimensioned drawing of the barrel extension/breech collar for the M16/AR15 series of rifles? Thank you, in advance, for any information you may be able to supply.

If you mean "blueprint" or working drawing, you can probably get a copy for the M16 from the Army Ordnance Museum in Aberdeen, Maryland The AR15 will be tougher to secure. Try Colt (800/962-COLT), Olympic Arms and Fulton Armory Slugging a Barrel I was interested in the comments in a recent Reader Forum about slugging a barrel ("Checking Bore Diameter," April 04).

Here's the way that has always worked well for me: First you will need a brass or steel rod, 2 or 3 inches longer than the barrel, of a diameter that will slip down

the bore with not too much clearance. Also, you will need a 6- or 8-inch length of the same material. Square one end of each piece, break the edge, and polish everything smooth. For the long piece, you can use a clearing rod if you have a flatface tip of the proper diameter.

Now you will need a soft, pure-lead bullet, just larger than the expected groove diameter of the bore in question, or a bullet that can be upset to be that way. Alternately, you can use a pure-lead muzzleloader ball and forge it to a suitable rough-diameter cylinder (hammer it out on your handy vise anvil). Shape one end like a bullet point, so that it will enter the muzzle at least one diameter and so that you have half or so sticking out. What sticks out should be just too big to enter. Not super big.

With the rifle, you don't have to take anything apart, but if it's a boltaction, you might as well remove the bolt. Clean the bore and lightly oil it. Stuff some rags or crumpled paper into the opened action up to the chamber, but don't fill the chamber. You are going to drive a lead slug through the bore from the muzzle and it will fall when it emerges into the leade and chamber, and you want to cushion it.

Swivel your bench vise so that the jaws are over the floor, and clamp the rifle barrel vertically so that the muzzle is an inch or two above the vise jaws and the buttstock is solidly supported against the floor. Oil the slug and insert the bullet nose into the muzzle until it stops. Take a brass, copper, or plastic-faced hammer and drive the slug into the muzzle until it is flush. You won't

hurt the crown. You should have cut a lead ring off the slug, sort of like seating a ball in a percussion-revolver cylinder. The lead that enters the muzzle now completely fills the groove diameter. Take the short rod and hammer and drive the slug a couple of inches or so into the barrel. Ideally, it should feel snug'not hard. Now take the long rod and push, or bounce the rod gently on the slug if necessary.

You will see everything progressing down the bore. If it feels and acts the same all the way down, you are in luck. If things suddenly fall before you reach the throat and chamber, grab your own throat and squeeze hard until you are no longer able to breathe (just kidding). In this case, you could say there is a problem. All kinds of things are possible. Try not to let the push rod fall or follow the slug into the chamber because, padding or not, you might mar the slug.

That's all there is to it, but good luck if you have to do this with a .22caliber barrel. Donald R. Vinson Tamaqua, Pennsylvania R&S Loading Arm I have an old Rogers & Spencer cap and ball in for restoration. It needs a complete loading-arm assembly. Dixie Gun Works has a reproduction assembly, but they're not sure if it will work. Do you know if it will work? William Hamm Randolph, Alabama The only way to be sure would be to buy the DGW replacement and try it. It would help to know why Dixie has doubts.

For example, did whoever made the replacement part make it to Rogers & Spencer specifications or someone else's?

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Southerner Derringers I'm inquiring about a project that a friend and I have been struggling with. We are restoring two Southern .41 rimfire derringers. The problem is that we don't have the ejectors for either gun. I would appreciate any help in acquiring info and schematics for this firearm. The owner wants them converted to .22 cal. Thank you for your time. Your Southern derringer doesn't show up in the Standard Catalog of Firearms, The Blue Book, or The Gun Trader's Guide.

However, in Flayderman's Guide to Antique American Firearms, a Southerner derringer is shown. It was produced by Brown Manufacturing & Merrimack Arms, Massachusetts, from 1866 to 1873. Caliber was .41 rimfire, and the barrel pivoted sideways for loading. No mention of ejectors is made, but the handgun had an extractor mounted under the barrel. The design was patented April 9, 1867, long before schematics as we know them today came into use.

If you can secure a copy of the patent (\$3) it would contain many drawings and a description of how the mechanism works. The problem is you don't know the actual patent number, just the date it was issued. Call the Patent Copy Sales office anyway and perhaps someone can help you. Worn

Remington Rails I have an old Remington 742 with a bolt that won't work properly. I've disassembled it, looked for burrs, etc. and everything looks to be okay. The bolt sticks in the forward position.

When I get it loose and bring it back to locked open, everything is fine. When I release the bolt, it won't go all the way into battery, and gets stuck again. I cleaned it, greased it, and everything else, but nothing seems to work. I heard from an old retired gunsmith that once upon a time Remington offered a repair on these because they said the rails were wearing out. I can't find any information to substantiate that. Any help you can provide will be greatly appreciated.

Take out the magazine box and look inside at the rails. It's very likely they are wearing, and the Remington factory no longer services the 742. However, you can go to Remington's website and you'll find out how to locate an authorized service center that can handle the fix. Sighting In I have a question about a Simmons scope my buddy bought. He has it mounted on a Savage .308 that has no iron sights because it has a bull barrel. We went out shooting to try to sight the scope in.

At only about 60 yards, we found that the bullet was hitting too high. We lowered the reticles as low as they would go, but found

that the rounds were still hitting 5 to 6 inches high. He does not have high mounts, and the base mount and rings were checked several times to make sure that they were securely fastened. I think it's possible the scope is defective, even though it is brand new, but was looking for a second opinion. Any feedback would be appreciated. Try the point of impact at 100 yards.

If it's still hitting high, a shim under the rear scope ring should solve the problem. Bally Red Label I have a Ruger Red Label 12-gauge (serial #411-30830) in for repair. The problem is the gun returns to safe after each barrel is fired. The customer says the gun is about a year old, and started doing this intermittently after about 200 rounds. It now happens almost every time. The internal mechanism is clean and the safety-ball detent is snug.

We understand the Red Label was plagued by gremlins in the safety system a year or so ago. Changes were made, and now the entire system has to be refit. The parts needed to make corrections are probably restricted, but Ruger will do the work at no charge if the gun is shipped to Customer Service (Sturm, Ruger & Co., Newport, NH 03773).

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