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INSIDE THE ARCHIVE

DISASSEMBLY/REASSEMBLY OF THE TAURUS MODEL 63

NRA FOUNDATION AWARDS \$10.7 MILLION • SCOPE MOUNTING: THE RIGHT WAY • CONVERTING A PERCUSSION REVO ...

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 005

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FROM THE ARCHIVE

NRA Foundation Awards \$10.7 Million

BY AMERICAN GUNSMITH EDITORS APRIL 2004

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The NRA Foundation announced recently that it had awarded a record \$10.7 million in grants in 2003 to support nearly 1,800 gunsafety and shooter-education programs throughout the United States. Sixty-eight percent of the funding went toward NRA youth programs as well as those of groups like 4-H, Boy Scouts of America, and hundreds of local clubs. Steven Andersen, Executive Director of The NRA Foundation, said: "The NRA Foundation has provided over \$60 million in grants since getting started in 1990.

We are especially grateful for the generous support of our donors and volunteers who, through their generosity in time and treasure, have allowed The Foundation to expand its funding of youth, education, conservation, and shootingsports activities. The NRA Foundation receives most of its grant money through the Friends of NRA, a volunteer-driven, grassroots fund-raising program that is operated by local committees of NRA supporters.

Half the proceeds raised by each committee is used to support programs in the committees' home states through state-fund committees that makes recommen-

dations for local grant funding. The NRA Foundation awards the other half to qualifying national programs, including those of the NRA. Since inception in 1993, the Friends of NRA program has held over 5,000 events and raised over \$50 million in net income.

Through its support of numerous NRA programs for youth, women, hunters, and other groups, The NRA Foundation is doing its part to guarantee that all Americans have the opportunity to learn about the safe and responsible use of firearms. In 2003, Pennsylvania had the highest number of grants awarded 233 in total and California grantees received the most dollars in awards at over \$530,000.

Established in 1990, The NRA Foundation, Inc. is a 501(c)(3) taxexempt organization that raises tax-deductible contributions in support of a wide range of firearms-related public-interest activities of the National Rifle Association of America and other organizations that defend and foster the Second Amendment rights of all law-abiding Americans. For more information on The NRA Foundation or Friends of NRA, visit their web site at or call Editor Keith Lawrence Technical

PEOPLE & COMPANIES

Disassembly/Reassembly Of the Taurus Model 63

Except for a stock nut and a key-operated security system, this Taurus rifle is a dead ringer for the original Winchester.

BY CHICK BLOOD APRIL 2004

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When John M. Browning opted out of his agreement with Oliver Winchester, one can assume there was some serious gastric distress in the company's New Haven headquarters. (It's been rumored that local sales of bicarbonate of soda tripled in a single day.) For years, Winchester had promoted its great asset't he long-time link with Browning't o the public. As a result, the public came to expect the latest and best guns would come from Winchester. What next?

Winchester had to prove it still had the right stuff, meaning competent in-house designers. As a company, Winchester couldn't invent or patent anything. The people they employed could, however, later assigning their patent to Winchester. Enter one of those employees: Thomas Crossley Johnson.

Just as they had with Browning's design for an automatic action'which walked out the door when Browning took his patent to another manufacturer'Winchester engineers and attorneys wrote the patent specifications for Johnson's simple blow-back action.

Because the powder charge had to have enough "push" to overcome the weight of the breech block, and since .22 cartridges of the day varied considerably in power

from one ammunition maker to the next, the company decided to chamber Johnson's rifle for the .22 Winchester Automatic Rimfire. They'd developed the round for the Model 1890 slide-action. Manufacture of Johnson's rifle began in 1902. The first public announcement was made a year later, and the Model 1903 re- The Taurus works with .22 LR standard velocity.

The Winchester didn't...and doesn't. mained in production until 1932. The 1903 was replaced by the Model 63, employing the same basic mechanism but considered a major improvement. The Model 63 was chambered for and worked well with .22 Long Rifle high-velocity cartridges. Lower-power .22 LR rounds usually caused extraction problems. The M63 was eventually discontinued in 1959 by the New Haven factory. Continuing their trend of reintroducing classic Winchesters, Taurus has brought back the Model 63.

While it lacks the take-down screw lock of the 1903, which was eliminated in later production of the rifle, it is equipped with the Taurus Security System. In this case, the system uses its key to block the firing pin. Field Stripping The Taurus Model 63 is easily taken down for storage, basic cleaning, or transport. Remove the magazine tube

DISASSEMBLY/REASSEMBLY OF THE TAURUS MODEL 63 CONTINUED

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B A The nylon drift (B) should be used to remove the forend cap support. The Taurus security-system key shown locks the firing pin for storage, completely from the butt stock. Loosen the take-down screw until it's fully loose in the frame. Gently pull the stock away from the barrel. No force, please. The rifle will separate into two pieces exposing most of the inner mechanism for inspection or cleaning. Use any good-quality solvent sparingly and avoid dripping any on the wood.

After cleaning, a light coating of oil should be applied to the metal surfaces. Again, lubricate judiciously. Excessive oil will end up causing malfunctions by accumulating dirt and unburned powder. Detailed Disassembly Good news. The pivot and retaining pins in the rifle are not dreadfully tight. With two

exceptions they can be pushed out in either direction with the proper size punch. More good news.

There is no such thing as a "factory tool" (which is almost never sold to the public) employed in the take-down and reassembly of the gun. Everything you need can be purchased at a hardware store or from Brownells. The process begins by completely removing the forend screws (#39). Sliding the forend cap (#36) toward the muzzle will reveal the forend-cap support (#35). The support is dove-tailed. They're removed and reinstalled through the square cutout in the receiver (arrow).

The security-system "keyhole" is at "B," tailed into the barrel. Position the barrel assembly with the receiver (#17) upside down.

Use a nylon drift to drive the support out to the right. To prevent any possible damage, it's a good idea to hold the forend back toward the receiver while doing this. Once the support has been removed, slide the wood off to the front. Invert the receiver. Looking down on it, you'll see the breech bolt (#21) in which is seated the recoil-spring guide (#33) and recoil spring (#32).

The guide protrudes from the front end of the bolt and is slotted. Place two or three fingers over the spring and unscrew the guide all the way. Pull the guide out to the front, the breech bolt out to the rear, and lift the end of the guide spring to free it. Set the parts aside. A B

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8 Magazine Tube Liner 9 Magazine Tube Washer 10 Magazine Tube Nut 11 Magazine Tube (includes #12, 13, 14, 15, 16) 12 Tube 13 Magazine Follower 14 Magazine Spring 15 Magazine Plug 16 Magazine Plug Pin 17 Receiver 18 Receiver Bushing 19 Ejector 1 Barrel 2 Front Sight 3 Rear Sight Assembly 4 Rear Sight Blade 5 Rear Sight Support 6 Rear Sight Rivet 7 Rear Sight Elevator 20 Breech Bolt Assembly (includes #21, 22, 23, 24, 25, 26, 27) 21 Breech Bolt 22 Firing Pin Spring 23 Firing Pin 24 Firing Pin Retaining Pin 25 Extractor 26 Extractor Plunger 27 Extractor Plunger Spring 28 Key Lock 29 Key Lock Pin 30 Key Lock Ball 31 Key Lock Spring 32 Recoil Spring 33 Recoil Spring Guide 34 Forend 35 Forend Cap Support 36 Forend Cap Assembly 37 Forend Cap 38 Forend Cap Pin 39 Forend

Cap Screw 40 Action Slide Spring Taurus Model 63 Semi-Auto .22 Rifle (Specifications subject to change without notice) 41 Action Slide 42 Action Slide Button 43 Action Slide Button Pin 44 Feeder 45 Ammunition Retainer 46 Ammunition Retainer Spring 47 Ammunition Retainer Pin 48 Hammer Spring Assembly 49 Hammer 50 Hammer Spring Guide 51 Hammer Spring 52 Hammer Spring Plate 53 Hammer Spring Guide Pin 54 Frame 55 Trigger Pin 56 Hammer Pin 57 Ammunition Retainer Pin 58 Assembly Screw Plunger 59 Assembly Screw 60 Assembly Screw Retainer 61 Tang Sight Screw 62 Trigger Spring 63 Trigger Safety 64 Trigger 65 Sear 66 Sear Spring 67 Stock 68 Buttplate 69 Buttplate Screw 70 Feeder Assembly

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Give the magazine tube plug (#15) a little turn to the right, and pull the magazine tube assembly (#12) clear of the stock. Back out the two Phillipshead buttplate screws (#69) and remove the buttplate (#68). A 7/8-inch socket along with an appropriate size ratchet is needed to undo the magazine-tube nut (#10). About the socket. It has to be the thin-wall variety to enter the hole in the buttstock.

If you can't find a thin-wall socket, grind down a regular one; there's very little room between the nut and the stock. Don't try to force things here with an oversize socket, or you'll split the wood. (If the M63 happens to be a Winchester, the tube nut will have two notches cut in it, and the socket will have to be further machined to fit those notches.) Once the nut is removed, the stock slides off to the rear.

Moving back to the bolt assembly, the extractor (#25), firing pin (#23), and firing-pin spring (#22) remain within. The firing-pin retaining pin (#24) is one exception to the "pushin-either-direction" rule. It must be pushed right to left while looking down on the bolt assembly. The pin Below left and In the photo to the right, the plate has been rotated and the assembly is being positioned for reinstallation.

The milled slot in the frame is visible to the rear of the plate-retaining pin hole. and its spring are removed to the rear. When reinstalling the firing-pin assembly, the beveled end of the firing pin has to face downward with the retaining pin captured by the milled cut in the firing pin. A small tool, perhaps a dental pick, can be inserted between the rear of the extractor and the plunger (#26). Press the plunger rearward and remove the extractor with your free fingers.

Those two screws (#61) have nothing to do with removing the stock. They're tang-sight screws unrelated to further take-down. What is closely related is the hammer assembly. It includes the feeder (#44). A good feeder it is, too, but it is the reason this rifle should never be dry fired. (Actually, that goes for all .22s.) The firing pin hits up against the barrel breech and can raise burrs or break the pin.

With this gun, if the hammer (#49) is allowed to fall unrestrained on the feeder, you will need considerable force to free it, leaving behind serious damage to the feeder. Damaged feeders equal feeding problems. A hammer jammed on the feeder equals a frozen action. All these troubles are easily avoided by not dry firing. In some guns, a paper clip can be used for this next step. In this

one, due to the extreme strength of the hammer spring, use either the smallest of hex wrenches or a #52 drill bit.

Cock the hammer and insert the hex wrench orbit in the hole located at the end of the hammer-spring guide (#50). To remove the hammer assembly intact, drift out the hammer-spring plate pin (#57) at the rear of the frame (#54). On the schematic, the ammunition-retainer (cartridge stop) pin is also identified as #57. If the stop ever needs repair or replacement, that pin will have to be removed to release the stop and its spring (#46).

It's not merely a matter of pushing the pin out as you will read in the section on detailed disassembly. (We've seen far more serious errors on schematics, and so, no doubt, have you.) Now push out the hammer pin (#56). Grasp the edge of the hammerspring plate with smooth-jaw pliers and tilt it. The tilt will partially raise it from its seat in the frame. Once that's been done, you can insert a screwdriver blade under the spring guide and pop the plate out of the frame.

Slide the hammer assembly off to the front of the feeder. The magazine-tube liner (#8) is snugged into the stock pretty tightly. Use a wooden dowel applied to the end of the feeder to tap the liner to the

DISASSEMBLY/REASSEMBLY OF THE TAURUS MODEL 63 CONTINUED

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rear. Underscore that “tap, tap, tap,” action (no bashing whatsoever for fear of feeder damage). Before you do that, however, notice the U-shaped plate at the rear of the feeder body. That’s a welded joint, folks. The liner and feeder are joined permanently together. As long as we’re taking a closer look at things, take one at the ammunition retainer (#45) and its pin (#47). Part #47 is the second exception to removing pins in this rifle. It’s hollow, like a roll pin, but has ahead on one end like a rivet.

You don’t remove it during disassembly. If anything ever goes haywire with the retainer assembly, you have to cut off the head end of the pin and push out what’s left with a roll-pin punch. Yes, replacements are available from the factory and, we assume, from Brownells. If replacement is needed, you’ll also need a rivet set tool. Next to come out are the safety spring (#27) and plunger (#26). This is followed by the trigger pin (#55), trigger (#64), sear (#65), and sear spring (#66).

Notice how the trigger spring (#62), which looks like a hook, is positioned on the trigger before pushing the trigger safety (#63) through the guard body. The assembly-screw plunger (#58) did not exist on the rifle I worked with for this article. It has been replaced with a retaining pin. I assume this is true with all Taurus Model 63

rifles. Outside of breaking down the magazine or taking off the sights, there’s nothing left to remove.

Parts replacement for the magazine is merely a matter of pushing out the necessary pins and pushing them back in to retain the new components. The front and rear sights drift out from their respective dovetails. Reassembly Tips The rifle goes back together in reverse order, so you begin with the safety, spring, and plunger. The safety locks the trigger and has a groove in the middle where the plunger seats.

Set the trigger in position, add on the sear-spring and sear (perhaps held in place by a dab of grease), and start in the trigger pin. Align the trigger assembly, push in the pin, and use a small tool to raise the trigger spring atop the trigger. Before running the magazine liner back into the stock and frame, take note of the cutout in the frame. It’s square. Obviously, then, the square end of the magazine-liner/feeder unit has to enter that cutout.

Once it has and the assembly is fully forward, secure the liner with the lock washer and nut. You may have to tap the liner in from the rear because of a tight fit. When reinstalling the guide spring in the bolt body, insert the spring first. Use your fingers to retain it in position and begin to feed the spring guide into the bolt. As the guide nears the end of the spring, insert a

small screwdriver blade behind the spring and push it forward, allowing the guide threads to engage their threads in the bolt.

Turn in the guide completely. When you replace the firing pin and spring, remember how their retaining pin came out. The ejector spring is followed in by the ejector plunger with its flat portion down. Depress the plunger and snap in the ejector. The toughest part of reassembly is the hammer group, because it’s difficult to compress the hammer spring. One suggestion: Open your vise jaws just wide enough to allow the spring guide to enter, get a firm hold on the hammer, and press inward.

When the guide-pin hole shows up, feed on the guide plate and insert your keeper pin. When the pressure is taken off, the spring will hold the plate against the pin. Align the hammer assembly with the feeder and slide it on. The plate will interfere with this unless you rotate it 90 degrees. When the plate lines up with its milled seat at the rear of the frame, align the plate with the groove and push down. Install the plate pin. Line up its holes and install the hammer pin.

Finally, pulling the keeper pin holding the spring out of the hammer strut will firm up the whole reinstallation. Now check everything out with dummy rounds’s afety, trigger, feeding, security system’t he works. Don’t you always? I

MAINTENANCE & REPAIR

Scope Mounting: The Right Way

Scope mounting is often perceived as one of those simple tasks that almost anyone can do. And as long as the proper procedures are learned and followed, anyone can perform this task correctly.

BY DENNIS A. WOOD APRIL 2004

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Hardware and farm-supply stores are my kind of places. I'm constantly on the lookout for items that will assist me when doing repair work on firearms. Most of these stores also sell sporting goods in some form or another. A lot of them sell scopes as well as mounting systems. In some cases, the high-school kid behind the counter will not only sell you a scope and mounting system, he'll attach it to your firearm for you.

I'm inquisitive and always willing to learn new techniques, so I ask these young lads a few questions: "I see you sell scopes and mounts. Do you mount scopes here?" The answer is most often affirmative. "Can you tell me how you do that?" As you can imagine, after listening to the procedure, I usually leave the store a little weak in the knees. The Scope Is the Key Before the correct mounting system is selected, the needs of the scope must be considered. What's the objective diameter (front end) of the scope?

Does the scope have an adjustable objective? Will the owner be using a flip-open lens cover? All of these factors add to the diameter of the front end of the scope and must be considered in the placement of the scope above the bore line. Most all scope objective diameters are measured in metric sizes—40 mm, 44 mm, and 50 mm, for example. To get the exact measurement of the scope's objective diameter, the best method is to actually measure it with a caliper.

Divide the result by 2 and write this dimension down for future reference. If the scope has an adjustable objective, measure over the adjustment ring and then divide this dimension by 2. When objective lens covers, like the flip-open variety, become apart of the mix and area stationary part of the setup, then measure over the outside diameter of the cover and divide this by 2.

Removable lens caps are more for keeping dust off the lenses when the firearm is not in use. The see-through mounts were used to get the

scope high, but do not serve the dual purpose they were intended for. use, so when I talk over scope setups with customers we usually decide that relieving any portion of the front scope cover that may hit the barrel is a better option than adding more height to the bases and rings.

For a scope with a one-inch tube, subtract .500 inch from the measured dimension of the objective diameter. For a 30mm tube, subtract .591 inch from the measured objective diameter. This figure was arrived at by multiplying the diameter in millimeters by .03937 to get the decimal size. The end result is the minimum height that we'll need to get the front end of the scope up high enough so it doesn't touch the top of the barrel.

Rings and Bases Scopes benefit the user most when mounted as close to the bore line as possible. If the scope sits inordinately high, the stock comb may smack the shooter's cheek during recoil, and that

SCOPE MOUNTING: THE RIGHT WAY CONTINUED

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Above left and action will cause flinching, and at extreme heights the scope could run out of adjustment before impact zero is reached. We now have the minimum distance calculated to ensure that the scope objective doesn't contact the barrel, so next we need to find a set of rings and bases that will be as close to that dimension as possible. Some base/ring manufacturers list nominal sizes of their low, medium, and high rings, but very few list how high the base sits above the receiver.

We need to measure that height with a caliper. The example here is a Winchester Model 70 action that has been rebarreled to .280 Remington using a #5 contour Douglas premium barrel. The owner has a Leupold 3.5-10, Vari-X III scope with an adjustable objective that he wanted mounted on the action. Which rings and bases will give the owner the lowest mounting possible without touching the barrel? Measuring the receiver ring, I came up with 1.339 inch diameter and divided that in half to get .6685.

Hold the scope over the receiver in the approximate location it will be when mounted to see where the front of the scope sits over the barrel. Measure the diameter of the barrel in that location and divide that number by 2. In this case, the halved dimension is .415 inch. Subtracting gives us a figure of .2535 inch. The diameter of the objective as measured over the adjustment ring is 2.000 inches, and that's divided by 2 for a dimension of 1.000 inch.

Subtracting half the scope tube diameter of 1.000 inch leaves us with .500 inch. Now, and finally, we subtract .2535 inch from .500 inch and that tells us we need to come up with a base and ring combination height of .2465 inch. The customer had also brought me a set of Burris medium-height rings and two-piece base set. With a digital caliper, I measured the height of the base from the bottom, inside radius to the top of the base at .208 inch.

The medium high, front ring measured .269 inch from the inside radius to the flat just above the dovetail, for a total of .477 inch. This would place the scope almost 1/4 inch higher than necessary. I measured a Burris low-height ring that I had in stock and found this dimension to be .154-inch high, combined with the .208-inch base, for a total height of .362 inch. This combination was still .1155-inch higher than necessary.

The closest match I found in my stock of rings and bases was with Weaver Imperial rings and bases. The base measured .192-inch high and the low front ring was .148 inch, for a total height of .340 inch. This combo will leave a gap between the scope objective and the barrel of approximately .093 inch. Setting Base Screws Some folks believe that scope-base screws should be torqued in place at 13 to 20 inch/pounds, depending on the length of the base screw.

An accurate torque wrench can run around \$150, with imports costing a bit less. I don't own a torque wrench, and I'm not a

proponent of torquing #6-48 or #8-40 base screws, as they are quite small on the minor thread diameter. Torquing any screw stretches that fastener somewhat and if overdone, can twist the head off the screw. I prefer the use of a drop or two of thread-locker after the screw holes in the receiver have been cleaned of any oil and residue.

The base screws also receive a bath in a dissipating solvent that removes all traces of oil in the threads and allows the thread-locker maximum adhesion. This process has never failed me, even on bases mounted to .458 Winchester Magnum rifles. When you consider how many drops of serviceable Loc-tite there are in a bottle that costs \$10, it equates to being a result-producing bargain.

For the base-mounting screws in the receiver ring, I always dry fit one screw at a time and then wiggle the base to make sure the screw hasn't bottomed out in the blind hole. If the base feels snug against the receiver, I'll back this screw out and then try the other screw in the same manner. If one of these screws does bottom out in the drilled-to-depth hole, I grind one or two threads off the end of the screw and then try it again until the fit is secure.

The receiver bridge usually has two through-holes for base attachment on most bolt-action rifles. Each mounting screw is snugged down individually, and then the bolt is inserted into the receiver. If no rubbing is detected on the bolt body, the fit is considered good. Before I install the

SCOPE MOUNTING: THE RIGHT WAY CONTINUED

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thread-locker-treated screws for the final time, I wipe a thin coat of oil on the base and then the receiver in the area the base will fit. This procedure helps prevent rusting between these two surfaces. The base screws are then tightened as much as possible with the appropriate wrench or screwdriver. There are those who give the rear end of the screwdriver a tap or two with a hammer while bottoming the screw into place, and they claim they can get an additional 1/8 to 1/4 turn of the screw into place.

I do this also, but I can't honestly say whether I'm getting any additional movement or not. Installing the Rings The most common style of scope rings sold these days are those for the dovetail front and windage-adjustable rear bases. These are very strong systems and will serve even the heaviest of calibers. The front ring is turned into place by inserting the dovetail into the base and then rotating it 90 degrees.

You've heard the warnings many times and I find it amazing that anyone would use their scope to turn this ring into place. Always use either a hardwood dowel or, better yet, an aluminum or steel one-inch-diameter rod, at least 10 inches long, to turn this front ring. I began using a light smear of antiseize compound on the ring dovetail surface quite a few years ago after dry twisting the ring dovetail off a Redfield front ring.

To this day, I can't say whether this was a flawed ring or if the interference fit was just too tight. I've removed rings installed by others and occasionally found the ring dovetail to show a shearing or galling affect on the engaging surface. The antiseize compound will eliminate this problem and help ease the ring into place. The bottom half of the rear ring is set into place after the windage-adjustment screws have been backed away enough to allow entry.

The goal here is to try and align the rear ring saddle with the front ring saddle as best you can. Your one-inch-diameter steel rod can now be used as a gauge to verify alignment of the ring bottoms. If alignment is difficult to determine, a light smear of yellow artist's oil-paint on your the steel rod will help. Slide the rod back and forth a couple of times to see if the impression reveals favor on one side or the other or the rear ring to the front ring.

Adjust the rings until the front and rear ring saddles show as even a rubbing result as possible. The paint will clean off with bore solvent. Another method I use to determine whether the rings are in alignment is done with ring-alignment rods purchased from Brownells. These aluminum rods are turned to cone points and, once clamped into the scope rings, will quickly show you any mismatch of the rings.

With these rods you will be able to determine if either base needs shimming or if the rings are not parallel with the bore line. At this point, I clamp the barrel in my padded-jaw vise and install my collimator into the muzzle end of the barrel. This is done to get a view of how the scope is sitting over the bore line. If the rear ring sits too far to the left or the right, now is the time to move it to the center. If the front ring is cocked off perpendicular to the bore line it will show up also.

Don't think for one moment that if you mount the scope tightly in the rings and then try to move the rear windage screws that the front ring will swivel along with any movement at the rear end. You will be bending the scope. And forget about those paper shims that come along with some ring sets. These can act like sponges when the rifle is used in wet conditions and will retain moisture that will rust steel rings.

Once the windage has been set as best you can with the collimator in place, take a look to see how the elevation is looking. This would be the time to shim the bottom of either the front or rear base to get the scope as close to center as possible. When the rings are tightened around the scope for the last time, we need to strive for an equal gap on both sides of the ring, and no thread-locker is needed for the ring screws. Ream or Lap?

We now have the bottom rear and front half of the rings fairly close to being in line. Next, we need to deal

SCOPE MOUNTING: THE RIGHT WAY CONTINUED

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with any vagaries involved with the manufacture of the rings that will prevent the scope from being held in place with maximum strength. Manufacturers allow themselves tolerances in the process to compensate for machine looseness and tooling that has become dull during cutting. The variables from their targeted dimensions can stack up to the point that the front ring may not match up with the rear ring as well as we'd like.

The situation could exist where each feature on one ring is at the high end of the tolerance and the other ring at the low end of the tolerance. Consider that the base height is also allowed a plus/minus tolerance. If these discrepancies are ignored while setting up a scope, the scope could easily be dinged, dented, or mangled.

With good scopes costing anywhere from \$400 to over \$1,000, I'm not going to stand in front of a customer and inform him that I hosed up a perfectly good scope because I didn't pay attention to what I was doing during the installation process. For the most part, a decent set of rings and bases will run under \$50, so the folks that make these can't spend a whole lot of time in the manufacturing process to ensure they are perfect in every way. That's where reaming or lapping comes into play.

An in-line ring reamer is an expensive tool to purchase, but it will remove material quickly for those instances where one ring is grossly out of alignment to the other, but

I have yet to find a good set of rings that needed the kind of assistance that the ring reamer offers. I prefer the lapping process, mainly because the equipment is reasonably priced and the procedure is easy to learn. The lapping rod and compound I use was purchased from Brownells and has served me very well.

Before I start any lapping, I first check to see whether the rings really need lapping. This involves a light smear of the yellow artist's paint on the lapping rod, but this time, with the top ring in place, snug enough that the rod will slide back and forth with some resistance. Push the rod back and forth while rotating it at least 90 degrees. If the paint has rubbed off showing a few high spots, we'll need to remedy this condition.

Clamp the barreled action in your padded-jaw vise and protect the top surface of the barreled action with paper towels and cellophane tape to prevent any of the lapping compound dribbling into some hidden place that will cause you ulcers later. On a small piece of masking tape, I mark each ring-top half either with an "F" or an "R" and an arrow pointing toward the muzzle. This prevents confusion as to which ring belongs where. Remove the top of the rings and lay the lapping rod into the bottom rings.

Install the top rings over the rod just snugly enough to allow the rod to move fore and aft with some resistance. Smear some of

the lapping compound into a few of the grooves in front of and to the rear of each ring. Work the rod until the grooves holding the lapping compound pass through each ring using a figure-eight motion. After 10 passes, remove the top ring and check your progress. If all of the bluing has been removed and no high spots are visible, go out and buy a lottery ticket.

If the bluing has only been removed in a few areas, you need to do another 10 passes. As the lapping progresses, each of the rings screws will need a slight turn to keep the rings snug against the lapping rod. Keep in mind that anything can be overdone and that also goes for lapping. If I can get 90 percent of the rings' internal surfaces square to one another, I'm happy and I'll call it quits. Clean up the lapping compound and install the scope.

We now have the rings set to hold the scope over the bore line to the point where there will only be slight adjustment of the scope's windage and elevation. Conclusions When you consider the overall cost of a rifle and scope system these days, the rings and bases assume a small cost in the equation. Yet, the importance of the rings and bases and how they contribute to the marriage of optics to the rifle are everything!

The simple task of mounting a scope on a rifle doesn't seem so simple once the effects of poor mounting or a mangled scope become understood. I

PISTOLS

Converting a Percussion Revo to Centerfire

Cartridge conversions are nothing new, but there is at least one to go about the process.

BY CHICK BLOOD APRIL 2004

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Under the spreading chestnut tree the village smithy stood.... When he wasn't busy shoeing horses or forging wagon-wheel rims, the village smithy often transformed blackpowder shootin' irons into cartridge-packing revolvers. He didn't worry about patents while he was doing it. We suppose it was because patent attorneys didn't have many spies afield in those days. es over loose powder, plus patch, ball, and cap.

The combat records of the .44 Henry rimfire, the .56 Spencer rimfire, and the .32 S&W revolver rounds on both sides of the conflict left little doubt that the cartridge was the future of both shoulder arms and handguns. The same could be said for an original antique M1858, but more than a cylinder would be required. But why would anyone want to convert a percussion revolver to the metallic cartridge in the first place?

Answer: The Civil War proved the advantages of self-contained cartridge. A man named Rollin White pretty much held back the future singlehandedly until after the war. In 1855, he was awarded U. S. patent #12649, which covered anew, bored-through revolver magazine (cylinder). The wording in the patent prohibited anyone in the United States from producing revolvers with bored-through cylinders until the patent's expiration in 1865. But Horace Smith and Daniel B. Wesson had no intention of waiting that long.

A year after his patent was issued, Smith and Wesson signed an exclusive agreement with White to manufacture his design. The result, in 1858, was the tip-up .22-caliber rimfire Model 1, First Issue. Ten years later, with White's permission, S&W entered into an agreement with Remington Arms allowing that company to convert its New Model Army to five-shot .46-caliber rimfire. Then and Now What the village smithy had to do when performing a full conversion is a mirror image of what you'd have to do today.

You would begin with the caliber desired. Let's suppose the antique revolver in hand is an original .44 caliber, and the customer wants a .45 Long Colt. The old .44 had a .444 bore diameter. The p Long Colt calls for a eter, so the .44 barrel t After that, a cylinder is built to accept the Long Colt cartridge. Then the frame is annealed and cut back to house a made-from-scratch recoil shield.

The rear of the action is reworked for a two-step hand, cylinder stop notches are cut, cylinder ratchets recut, the revolver retimed and headspaced, the barrel milled for an ejector housing, the ejector system built, and the frame case rehardened.

CONVERTING A PERCUSSION REVO TO CENTERFIRE CONTINUED

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And that's still not all. If performing a Richards-Mason conversion, add a firing pin to the hammer. If just the Richards conversion is chosen, part of the hammer has to be cut off and a floating firing pin installed in the frame.

Assuming your skills and equipment are up to it, you could convert any number of original percussion revolvers. (Perish the thought.) Or, you could forget all of the above and leave your cowboy-action customer's highly valued antique sidearm alone except to replace its percussion cylinder. R&D Gun Shop Period. no relation to the Ken Howell whose massive custom cartridge book partially filled these pages in June 1999) op-

erates R&D, and would have been most unwelcome in Rollin White's or the smithy's vicinity.

His cylinders are unique, true dropins. A cowboy-action participant can switch back and forth between smoke Consider this a test. and smokeless's imply by pulling out the cylinder pin and substituting one cylinder for the other. It sure speeds up the reloading process. The back plate on Howell's cylinder lifts off with the fingers. When it's in place, it serves each loaded cylinder with ingeniously conceived floating firing pins.

The Model 1858 Remington shown here is a handsomely made Uberti reproduction pr r's & Company, Inc. It lacks adjustable sights, so

it cannot be used in "modern" cowboy-action competition. Wearing the Howell cylinder, however, it can be used with smokeless .45 Long Colt rounds, then loaded up with commercially available blackpowder ammo for a "frontier cartridge" shoot out.

If the competitor wants to broaden his participation, he can switch back to the percussion cylinder and get it on in the "Frontiersman" category. Shooting Means Dirt Whether converted or not, sooner or later the revolver will need a detailed cleaning. For those who missed the April 2003 issue and the full feature on the 1858 Remington, I'll briefly

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address the disassembly directions here. Whether you use these instructions merely for a clean up or decide to accept the challenge of a full conversion is purely up to you. Be assured, the latter will require considerable study of the procedures previously outlined. And, to my knowledge, no single source of step-by-step instructions exists.

Perhaps we can encourage Ken Howell to contribute apiece or two on the subject without violating any of his proprietary methods. (Listening, Ken?) The grips come off after the grip screw is removed. You full cock the hammer, pull the trigger, and ease the hammer down. Loosen the mainspring screw to take the tension off the spring, and then tap the spring to nudge it out of its frame slot. Remove the triggerguard screw and pull off the guard. To keep from losing the trigger-bolt spring, invert the gun before backing out the spring's screw. No danger of spring loss now.

Now turn the revolver right side up and remove the trigger screw from the left side of the frame. This will free the bolt and trigger. Depress the hammer enough to see the hand and hand screw, undo the screw, and pull the hand down to remove it with the hammer spring still attached from the bottom of the frame. In from the bottom, by the way, is how the hand spring

must be reinstalled. Pull the hammer free by its top before pulling the loading lever about half-way down and taking out the lever screw. The lever assembly, including the base pin, link pin, and plunger pin is separated from the frame toward the muzzle. Among other things to keep in mind is the hammer roller. It must have free movement to avoid a horrible trigger pull. And all pins in the gun should be worked out or in on a nylon bench block.

A great deal more on the Remington, Colt, Allen & Wheelock, Starr, Whitney, and Cooper percussion-revolver conversions is to be found in what we consider the standard reference on the subject titled *A Study of Colt Conversions and other Percussion Revolvers*, by R. Bruce Mc Dowell. This is a book anyone even mildly interested in conversions should have in their gun library. Krause Publications an AGA supporter, 800 drawings and photos.

Anyone who's interested can order a copy of the Rollin White patent (or any other patent, for that matter) by sending a check for \$3 made out to Commissioner, Patents and Trademarks, and mailing it to the U. S. Patent Office, Washington, DC 20231. Don't forget to include the patent number, unless you can afford the cost of a patent search. I

MAINTENANCE & REPAIR

Applying Metal-Lined Bushings, Bedding, and Shims

Epoxy-based compounds like Brownells Accu-Weld can solve numerous gap-filling problems for the gunsmith. This technique, however, can add wear and chemical-resistance to the bonded surface.

BY NORMAN E. JOHNSON APRIL 2004

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Bonded-in-place metal shims, placed between two important gun parts, can be particularly useful in gun repair, restoration, and action bedding. The method outlined here results in a highly wear-resistant surface with virtually zero tolerance. The basic principle of this method involves placing a thin, flexible sheet of steel or other metal between two surfaces. One of the high-impact epoxy-based adhesives (such as J. B. Cold Weld, Brownells Accu-Weld, or the like) is used as a bonding agent for the metal sheet.

The thin formable sheet of metal, along with the bonding agent, totally takes up the space between the surface of the parts, with zero tolerance, leaving one part coated with a high-impact, wear-resistant, metal covering. The Technique in Use As one example, I recently used this technique to reduce the tolerance between the barrel and frame of a singlebarrel shotgun. Before adding the plating, there remained a gap between the

barrel and frame with looseness and poor contact of the parts as the action was closed.

I felt that the use of a bare, uncovered, bedding-like material to fill the gap would leave the surface unsightly, essentially unprotected, and not fully resistant to oils or chemicals. I then got the idea to plate the filler/bonding material with a thin sheet of metal. Such a metal covering must be thin, flexible, and formable, yet wear-resistant. I experimented with different materials and finally chose 0.002-inch chrome shim stock. It is fully formable and can be readily cut with a sharp knife or scissors.

Thicker material is less formable, and tends to cause the bonding material to exude from the spaces with incomplete forming of the plating as parts are placed together. The idea is to have the bedding or cold-weld-type material totally fill the space between the parts with the membrane of formable sheet steel as an interface or coating. A perfect zero-tolerance contact is then made between the two parts, resulting in a wear-re-

sistant, high-impact surface. While developing this procedure I found it easy to apply.

The accompanying photos will help to clarify the procedures. In another instance, I had a loosefitting joint pin at the barrel lug juncture of a Stevens Model 107-Series shotgun. Close inspection of the juncture where the barrel met the standing breech-face indicated a visible and measurable gap. A feeler gauge showed the tolerance to be about 0.0035 inch, and the barrel could readily be moved as the action was closed.

As a means of correction, some gunsmiths recommend peening the race where the joint pin fits the barrel lug. I believe this is a poor substitute for correcting such a condition, and would be temporary at best. The half-circle-shaped barrel lug was cleaned up and roughened slightly with abrasive paper. Following this, I cut a 3-inch length of 0.003-inch The thin, pre-formed shims are shown with holes made to fit the scope bases.

APPLYING METAL-LINED BUSHINGS, BEDDING, AND SHIMS CONTINUED

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B. Weld or Brownells Accu-Weld is applied to the top of the receiver in preparation for laying down the shims. steel shim stock and roughened one side while it was still flat. I then drew it back and forth over a 1/4-inch mandrel held in a vise to shape it to the diameter of the barrel-lug contour. Shim stock is very easily formed in this way to conform to the shape of the area where it will be placed, and much easier to hold in place as the bonding agent forms and sets.

After the shaping, I cut apiece the exact size of the half-circle barrel lug. The piece formed a perfect fit, and was slightly roughened on

the side where bonding material was later applied. With the shim shaped to size, I mixed up some J. B. Weld and lightly coated both surfaces with the liquid material. A small tweezers was used to place the shim into the barrel lug where it was precisely positioned.

As a means of retaining the shim as the liquid bonding material is setting, the gun barrel could have been put together as the joint pin engages the lug, but I felt this could disturb the shim position. So I chose to place the removed joint pin into the barrel lug. This is a good way to unite two surfaces that have

poor contact. and held it there with rubber bands. The tension of the rubber bands drew the joint pin squarely into the lug mortise.

The liquid epoxy sets in several hours, enough to separate the parts, and can be put to normal use after 24 hours. After I re-assembled the shotgun, the action closed as smoothly as anew one with no measurable or visible space between the barrel and breech-face. Other Applications For Metal-Coated Shims As is often discovered, some scope bases result in a very poor fit with the receiver. I have performed special

APPLYING METAL-LINED BUSHINGS, BEDDING, AND SHIMS CONTINUED

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Such shims form a microscopic fit between scope bases and receiver. contact tests only to find there is less than 30-percent actual contact between base and receiver with some base applications. This was particularly true of a pair of scope bases I was adapting to a shotgun receiver. There were no designated bases for this gun, so I took the closest fit I could find. Each base radius was oversize and left a gap at both undersides.

I couldn't think of a better place for my new technique of steel plating over epoxy bonding material. The completed work would later al-

low me to remove the bases and still leave a metal surface instead of the raw epoxy finish. (continued on page 21) In this case, I used 0.002-inch chrome shim stock, cut to the exact base size with scissors. I simply marked the screw holes with a finepoint marker and cut them a bit oversize with an abrasive bit in a highspeed grinder.

Ample release agent was applied to the underside of the bases where they met the shim stock and into the screws and screw holes. Tape or release agent was also applied to the sides of the gun receiver at the outer margin

of the bases. After coating the surface of the gunmetal beneath the shim material with bonding agent, the shim stock was carefully placed over it with the screw holes aligned. The bases were then screwed in place over the shim stock.

As the screws were evenly tightened down, the excess bonding material oozed out along the sides and end of the bases. Here I used a sharpened piece of wood to remove all excess material along the bases. Even with release agent or tape to catch the loose

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material, I always remove and cleanup all the excess bonding material to be sure it is neat and clean around the edges before it hardens like steel. Before the liquid epoxy reaches the

fully cured state, I alternately loosened and tightened the screws to be sure they weren't being bonded in place. You can even remove

them one at a time and apply a film of oil to them and into the screw holes. Bonding material such as J. B. Weld or I

RIFLES

Working the First Pump Shotgun: The Spencer Slide-Action

Christopher Spencer, the well-known and highly respected rifle designer and developer, also produced the 19th century's first pump shotgun.

BY DAVID R. CHICOINE APRIL 2004

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The Spencer slide-action shotguns—or as we commonly call them, “pump-action” shotguns—were introduced in 1882, and became America’s first successful slide-action repeating shotguns. This unique repeater was designed by the famous Christopher Spencer, the same Spencer who earlier pioneered a highly successful repeating rifle and carbine that were used extensively by the Union during the Civil War, with more than 100,000 produced for that conflict.

Spencer’s pump shotgun was available in 10- and 12-gauge, although the 12-gauge is more commonly encountered today. There were also a few take-down versions of the Spencer shotgun produced, although these are very scarce and seldom encountered. Spencer’s unusual-looking gun made use of what ap-

pear to be two triggers, with the conventional trigger located at the rear of the guard and another located closer to the front of the guard.

That front “trigger” was actually the bottom of the hammer, and it was an early form of decocking mechanism as well as a cocking indicator. The gun was equipped with a rebounding firing pin so it could be more safely carried with around in the chamber. With the hammer in the lowered position, by pushing forward on the front “trigger” the hammer could be quickly cocked for firing.

The Spencer used the vertical, reciprocating action of its massive breech block to perform the multiple functions of loading tray, cartridge carrier, breech bolt, and ejection tray. In action, the Spencer is seemingly a very

busy gun; when the slide is oper- Top of page: America’s first successful pump shotgun was the Spencer, this one with a 32-inch full-choked barrel. The gun appears to have two triggers, but the forward “trigger” is actually a decocker and cocking indicator. Author photos.

That’s the externally mounted extractor. Ated, the bolt first drops down through the bottom, then pops up through the top of the action, before settling back to the center. From examining the cutaway drawings, you’ll see that the Spencer is actually quite simple, and like all of Spencer’s weapon designs, quite robust. Spencer manufactured these shotguns at his Windsor, Connecticut, factory until 1889, when financial troubles caused him to mortgage his prop-

WORKING THE FIRST PUMP SHOTGUN: THE SPENCER SLIDE-ACTION CONTINUED

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When the slide is moved forward, the front of the action-barmounted extractor pushes the shell into the chamber and the bolt is cammed back down into battery. erty to the Pratt & Whitney Company. Further difficulties followed, and when he was unable to make mortgage payments, Pratt & Whitney foreclosed on the property.

All of Spencer's machinery, his patents, and roughly 300 guns were subsequently sold to Francis Bannerman & Sons of New York City, who continued to manufacture and sell Spencer guns as the Spencer-Bannerman up until about 1907. Takedown Procedure 1) Always check to be very sure the weapon is unloaded before you attempt to handle, or attempt to disassemble any firearm. Be certain the weapon is pointing in a direction where no one would be harmed in the event of an accidental discharge.

In the case of the Spencer, you can tell quickly if the hammer is cocked by the position of the "front trigger" or decocker, which is actually an extension of the hammer that can be used to decock the weapon. If the decocker trigger is all the way forward in the trigger guard, that indicates that the hammer is cocked. The hammer can be safely lowered by holding forward on the decocker trigger and then pulling the rear trigger.

Use care to allow the decocker trigger to move slowly rearward; in this way, you can safely lower the hammer. Now operate the slide handle by moving it all the way to the rear. The breech block will remain in the up position. Turn the gun over and reach into the lower portion of the receiver, and use your thumb to depress the inside of the shell catch. This will release any cartridges in the

magazine and the spring pressure from the magazine spring will cause them to slide out the bottom of the action.

To be sure that a previous cartridge did not get into the shell-carrier part of the breech block, operate the slide handle all the way forward and then immediately all the way to the rear once again. If a cartridge is present in the breech block, it will now be ejected. 2) First remove the buttstock. Unscrew and remove the tang screw (#11) located at the top of the receiver tang, and then remove the buttstock screw (#10, a wood screw) from the rear of the lower tang.

The buttstock (#7) can now be pulled straight back and off to the rear. The buttplate (#8) can be removed from the stock by first unscrewing the two buttplate screws (#9). 3) Remove the trigger guard and the mainspring. Unscrew and remove the trigger-guard screw (#50) located at

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the rear of the triggerguard (#49). The trigger guard will now slide forward about 1/4 inch and can be removed from the lower tang. Loosen the strain screw (#13) and grab a pair of spreader-type pliers. Reach inside the rear of the receiver and get the pliers in between the inside top of the receiver (#1) and the mainspring (#12). Use the pliers to compress the mainspring far enough so you can pivot the breechblock stirrup (#45) forward to disengage it from the mainspring.

The mainspring is now carefully pulled out to the rear. As you remove the spring, note its relationship to the hammer stirrup (#43) for reassembly later. 4) Remove the trigger-group by holding the trigger to the rear, and unscrewing and removing the lowertang screw (#29) located on the lowerleft side of the receiver in line with the decocker/trigger. Then remove the other lower tang screw (#30). This is the only screw located on the receiver top.

The lower-tang assembly (#28) can now be pulled straight down out through the bottom of the receiver. At this point, the ham-

mer (#37) is loose, and can be lifted up out of its place in the lower tang. The trigger-spring screw (#36) can now be unscrewed from the bottom of the lower tang and the trigger spring (#35) is lifted up out of the lower tang.

Drive Spencer Slide-Action Shotgun 1 Receiver 2 Barrel 3 Breech Block 4 Breech Block Pivot Screw 5 Trigger Guard 6 Trigger Guard Screw 7 Buttstock 8 Buttplate 9 Buttplate Screw 10 Buttstock Screw 11 Tang Screw 12 Mainspring 13 Strain Screw 14 Action Slide Plate, left out the trigger pin (#34) from the side of the lower tang and lift the trigger (#33) out. 5) To remove the magazine, unscrew and remove the magazine-cap screw (#25), which is located at the bottomfront of the magazine tube (#23).

Pull the magazine tube down just a little at the front end, and then slide it forward and out of the action.

The mag- 15 Action Slide Plate, right 16 Action Slide Plate Screw 17 Action Slide 18 Extractor 19 Extractor Pin 20 Extractor

Pawl 21 Extractor Pawl Spring 22 Extractor Pawl Pin 23 Magazine Tube 24 Magazine Cap 25 Magazine Cap Screw 26 Magazine Follower 27 Magazine Spring 28 Lower Tang 29 Lower Tang Screw, side 30 Lower Tang Screw, top 31 Shell Catch 32 Shell Catch Screw 33 Trigger 34 Trigger Pin 35 Trigger Spring 36 Trigger Spring Screw 37 Hammer 38 Action Cam 39 Action Cam Spring 40 Firing Pin 41 Firing Pin Spring 42 Firing Pin Retainer Pin 43 Hammer Stirrup 44 Hammer Stirrup Pin 45 Breech Block Stirrup 46 Breech Block Stirrup Pin 47 Forearm 48 Action Slide Cap 49 Trigger Guard 50 Trigger Guard Screwazine spring (#27) and magazine follower (#26) will come out with the tube.

Be sure to note their relationship for later reassembly. The magazine cap (#24) on most guns is retained by across pin, but it is not normally necessary to remove the magazine cap. 6) The action slide and breech block are removed by unscrewing and re-

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The numbers refer to the table on the previous page. moving the four action-slide-plate screws (#16). There are two of these screws on either side of the receiver. Then slide the action-slide plate (#15, right) and action-slide plate (#14, left) out toward the front of the receiver. Notice that these parts are made as uniquely left and right; they will only fit back in where they came out.

When you have the action-slide I plates removed, lift up the left-sidearm at the rear of the action slide (#17) to allow it to clear the breech-block cam slot, then pull the action slide forward and out the front of the receiver. Unscrew and remove the shellcatch screw (#32) from the right side of the receiver, and then lift the shell catch (#31) off the receiver side.

Unscrew and remove the breech-block 003inch chrome metal shim bonded to the barrel lug to eliminate wear between the joint pin and barrel lug. pivot screw (#4) from the left-rear side of the receiver. The breech block (#3) can now be tilted down and pulled forward and out of the receiver. 7) The firing pin (#40) can be removed by first driving out the firing-pin retainer pin (#42, not illustrated) from the side of the breech block.

The firing pin and its spring (#41) are pulled out through the rear of the breech block. That completes the disassembly of the Spencer slide-action shotgun. You simply reverse the procedure to reassemble the weapon. Brownells Accu-Weld is more likely to penetrate the release agent than epoxy-

based glass bedding would, particularly under pressure. After several hours of setting time, with a little extra heat applied to the parts, the bases were removed, leaving a most perfect fit.

The chrome shim stock cut exactly to size left a most attractive surface, and I could see the two surfaces had a microscopic fit. Conclusion This method of applying metal-lined bushings and shims produces joints and contact surfaces of extremely close tolerances. The metal plating or shimming wears well and resists oil and moisture damage. From an aesthetic point of view, the finished job is very appealing too. I know I'll find other uses for this technique, and perhaps you will, too.

METALWORKING

Reader Forum

BY AMERICAN GUNSMITH EDITORS APRIL 2004

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Lightening M-N Trigger I have a Mosin-Nagant Model 91-30, 1943 rifle. It has a 9-1/2-pound trigger pull. It has a very strong firing pin spring and a strong trigger spring. I would like to lighten the trigger pull to around 5 pounds. I tried to find an aftermarket trigger but no luck. Any suggestions on how I can safely reduce the trigger pull? The sear, itself a spring, partially serves to return the trigger after the trigger has depressed the sear to move its nose out of engagement with the cocking lug.

The trigger/bolt-stop spring also performs double duty on the gun. All springs mentioned are the flat variety, and would have to be thinned to lessen their tension. Instead, we suggest you approach the job from another angle. Polish the striker, striker tunnel in the bolt, sear nose, and cocking lug, and slightly reduce the sear-nose engagement surface with the lug. CZ Tech Info I would like to obtain blueprints and/or a technical manual for a CZ-24.

If you don't have the blueprints or technical manuals available, could you direct me to where I could obtain them? We don't and have never had blueprints for any firearm. They would only be available from the manufacturer. Nor do we have a technical manual, by which we suppose you mean a field/factory service manual. Contact CZ-USA, at They probably won't part with the blueprints, but they'll lead you to an owners manual at least. Boring Classic Revolver?

I have a customer that has brought in a Colt 1st Gen WCF with a bad barrel, and he wants to convert it to .45 LC. He has a new

Gun Parts .45 barrel, and wants to know if I can ream out the cylinder (very good condition). Would it be safe to do, and have you ever run an article on this? If your customer has what we think he has, it was manufactured in the mid-to late-1800s and is worth about \$3,000 even in 10-percent condition.

There's enough material to bore out the .38 cylinder to .45, as long as blackpowder and nothing but blackpowder loads are used. We have not done an article on boring out classic revolver cylinders, however, and would not consider modifying an antique of this value. Checking Bore Diameter I have a couple of questions regarding a Winchester 73 in 44-40 caliber that I have in my possession. I got this rifle about a year ago and cleaned it all up, and it is a good functioning weapon.

I bought a box of PMC ammo for it, and shot about 15 rounds. I then reloaded some ammo of my own and shot about 20 rounds of that ammo with no apparent problems. I read an article last week and it stated that the Model 73 44-40 barrel was .427-.428 diameter. The reloads that I made were with a Hornady 180grain HP/XTP bullet that I got from my Hornady manual. I later noticed that they are .430-diameter bullets and were tested in a modern-day rifle or pistol.

The article suggested that one should have the barrel slugged to check the true barrel diameter. How does one check the barrel diameter of this rifle and does he check the muzzle end or the breech end or both? Does one have to disassemble the rifle to get the slug (Cerro Safe) out, regardless of where it

is checked? It appears that even with the rifle disassembled, there would be a problem getting the slug out of the breech end unless the barrel was removed. How big a slug should one make. Is there a simple way to make this check? Could these .430 diameter bullets create a problem by firing them in this rifle? The old, original .44 had a .444 bore diameter. The slug is not made of Cerro Safe. A soft lead slug in the appropriate caliber is pushed from breech through muzzle the bore diameter of the barrel.

This is accomplished with the Model 1873 by disassembling the rifle and inserting your pushing rod through the hammer slot at the rear of the receiver. The caliber .44 bullet of today measures .429 diameter (10.91mm). Assuming there is to be no need or intent to use loads sneaking over maximum, a .430 bullet diameter should present no serious pressure problems. Patent Numbers? Not too long ago you ran an article about writing to the U. S. Patent Office in order to get info on a gun.

I currently have a Savage Model 99, .250-3000, in shop that I would like to get more info about. The only problem is that it doesn't have a patent number anywhere on it. Not even the classic "patent pending." I also have an H&R pistol which didn't have a patent number anywhere on it. I know this was a first issue production, but there were no schematics of it that I could find. It was way different from the published diagrams that I do have.

I guess my question is, how do I email to Chick Blood, Technical Editor, at

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(continued from previous page) where can a patent number be found? Could the guns have been built too early to have a patent number? (We're talking early 1900s for both.) Is there somewhere I can look up the serial numbers by model that will tell me what the patent number is? Thanks. Virgil Meador Sterling, Virginia The .250-3000 was a featured M99 chambering in 1913, but our references on both Savage and H&R turn up no patent numbers.

We suggest you write to the NRA Museum (Waples Mill Road, Fairfax, VA 22030) and request their assistance regarding the patent numbers. Otherwise, a costly search will have to be conducted by the patent office as was discussed in the article. Left-Handed Mini? I would like to modify my Mini-14 Ranch Rifle to cycle manually. I am left-handed, and the brass and action gases are bothersome flying across my face. I would also like to be able to reverse the modification.

I have not found any documentation on how to do this properly, and Ruger does not offer any, at least not by phone. I have tried to purchase an additional gas block, as I thought that would be a good place to start, but there are not any around. Numrich shows an indefinite back-order time. Your suggestions would be appreciated. What you wish for may be impossible

without left-oriented parts. Ruger doesn't produce a left-handed Mini-14 or left-handed parts for a righthanded rifle.

Our sources tell us that no one else does, either. Since there seems to be no way to modify your rifle and reverse the modification at a later date, you seem to be left with these choices: Use the Mini you have as a bolt rifle, and load one round at a time; purchase a left-handed bolt rifle that is magazine fed; or call the Custom Gunmakers Guild and see if one of their members would be interested in taking on the project.

Without the right left-handed parts, it would be a "project." Info on 1895 Lee Rifle I have recently acquired an 1895 Lee Straight-Pull Navy Rifle, which is eventually destined to be displayed at the USMC Command Museum at MCRD San Diego. I'm dismayed to find that I don't even know how to remove the bolt! I need help with instructions for field stripping, any maintenance peculiar to the piece, illustrations if at all possible—in short, all the info and history that may be out there.

I'd appreciate any help you can provide, since I hate to risk proceeding in ignorance. Thanks. Since the rifle was a military model, try calling the U. S. Army Ordnance Museum in Aberdeen, Maryland Russian 7.62mm Ammo I have a concern about the use of Russian-made 7.62 ammunition in

American .30-caliber barrels. When I mentioned interest in acquiring a Ruger Mini 30, and expressed my intention to fire Russian 7.62x39 ammunition, a local gunsmith told me not to do so.

He said the bullets are not .308, but .311 diameter. I measured the bullets on two different brands (Wolf and Barnaul) and found this to be the case. Could this also be true of other .30 caliber loadings? I recall the incident in "The Case of the Bogus Bargain" in the December 2001 issue of American Gunsmith. I wonder if it was not only the steel case, but also overpressure due to the bullet diameter that caused the locked-up action. In my opinion, it could certainly bear a closer look.

It would definitely increase the pressure, but to what degree I can't say. Gordon Heggenes Winlock, Washington Your gunsmith is a credit to the profession, and he's not the first to warn of oversize bullets in Russian-made ammunition. We have no idea how the stuff gets into the States without meeting the same S. A. A. M. I. specifications all domestic manufacturers are required to meet.

Yes, the Russian-surplus is cheaper, but forcing oversize slugs down a bore too small can cause anything from a bulged barrel and swollen cases to a disintegrated receiver.

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