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INSIDE THE ARCHIVE

GUNSTOCK RESTORATION AND REFINISHING: TIPS FROM A SPECIALIST

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ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 021

DIGITAL ARCHIVE EDITION

Preserved for the bench.

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FROM THE ARCHIVE

Winners Announced in Annual Contests

BY AMERICAN GUNSMITH EDITORS AUGUST 2005

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Hundreds of photos and stories about newcomers to the shooting sports poured into the National Shooting Sports Foundation's (NSSF) headquarters for the annual Step Outside® photo and story contests. From that extensive field of entries, judges selected three winners in each contest. Those six communicators, ranging from a 6-year-old Pennsylvanian to a well-published professional writer from South Dakota, will split prizes totaling \$3,200.

First-place winners will receive a \$1,000 gift certificate to an outdoor retail store, while second-place winners will receive a \$500 gift certificate and third-place winners will receive a \$100 gift certificate.

All of the entries were judged on how well they reflected the Step Outside theme of introducing new participants to target shooting, archery, hunting, and fishing. "These entries have demonstrated that enjoying a day of target sports, fishing, and hunting with family and friends can be rewarding in several ways: spending

quality time, passing on tradition, and having fun," said Melissa Schilling, NSSF's national coordinator for the Step Outside program.

The winners of the 2004 photo contest are: • First place: Alex Ellis, 9; Kersey, Pennsylvania • Second place: Audrae Ellis, 6; Kersey, Pennsylvania • Third place: Brittany Wutkowski, 13; Carteret, New Jersey
The winners of the 2004 story contest are: • First place: Berdette Zastrow, 62; Columbia, South Dakota, for "A Step Outside Outdoor Year" • Second place: Paul E.

Moore, 41; Henderson, Kentucky, for "Jeremy's Outdoor Awakening" • Third place: Tracy Christine Ertl, 39; Green Bay, Wisconsin, for "Stepping Out From the Past" Step Outside, a program of NSSF, developed the story and photo contests to draw attention to its call to outdoor enthusiasts, encouraging them to introduce newcomers to target shooting, archery, hunting, or fishing. The program has introduced thousands to these outdoor pastimes.

To view 2004's winning entries, visit and for information about the 2005 contests, visit

PISTOLS

Disassembly and Reassembly Of the Sigarms P210-6

A variation of the classic Browning design with some significant improvements, this Sig is considered to be the finest production pistol ever made—and its performance lends support to that reputation.

BY CHICK BLOOD AUGUST 2005

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Back in the good old days, when I had time, I used to do a lot of target shooting in U. S. Revolver Association postal matches. These were and are three-month-long competitions among clubs nationwide, and the word “revolver” in the sponsoring organization’s name is somewhat misleading. It’s true there were specific courses of fire limited to wheelguns, but most rounds came out of the barrels of .22 LR and .45 ACP self-loaders.

Each week, the official targets would be fired, scored, attested by the clubs’ USRA official, and mailed to the associations’ headquarters. There, all targets received would be examined, total team scores entered on bulletins published on a monthly basis, and the bulletins returned to participating clubs for all to view.

It was both interesting and challenging to see how our teams were doing against all the other club teams entered in the competition and, often, how much better our scores would have to be to capture top-gun distinction in the various National Match Course and Slow Fire matches. We burned a slew of ammunition, but it was great indoor practice at 50 meters for the outdoor 25- and 50yard NRA-approved 2700 matches that came with warmer weather.

The bulls on the 50-meter targets are small in comparison to the longer-range black circles and, in the opinion of most that drew down on them, tougher to hit. I must have participated in at least 20 USRA postals and I never saw a 9mm pistol on the line for any centerfire competition. There were uncountable numbers of accurized M1911s and a few S&W Model 52s, but nary one “wonderline.” Perhaps we all overlooked something.

That something had its beginnings with a patent awarded to Charles Petter, a Swede, in 1934 that evolved into the French Army’s MAS-35. The pistol design was a variation on the Browning swing-link system, with its firing mechanism housed as a separate, removable unit. A fine handgun, it was seriously handicapped by a terrible cartridge—the 7.65mm Longue. (Look up its performance. It displayed a 5-shot group measuring less than 1-1/2-inch overall with three shots grouping inside 1/2 inch. And it’s a 9mm!

An 87-grain bullet staggering out a muzzle at slightly over 1000 fps is hardly an effective battlefield weapon.) Realizing this, a little late I’d say since the light failed to dawn until after WWII, the French Army insisted on a more respectable caliber. The pistol was redesigned to accept the 9mm Parabellum and renamed the MAS 1950, or MAC 1950, depending on its place of manufacture.

DISASSEMBLY AND REASSEMBLY OF THE SIGARMS P210-6 CONTINUED

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Step back to 1937 for a minute. In that year, Sigarms of Switzerland acquired rights to the Petter patent and began improving upon the basic design. Finally satisfied with their redevelopment in 1948, Sig introduced the modified Petter as the SP47/8. It locked and unlocked via the familiar Browning camming method; the somewhat overhauled firing mechanism remained housed in a removable module; but the slide rails rode inside the frame rails for greater support, improved accuracy, and longer service.

Almost immediately, the Swiss Army adopted the SP47/8. It was purchased in large numbers by the West German Border Police and the Danish Army, although it was considered too expensive by most other armed forces. Today, as the P210-6, it is considered to be the finest automatic pistol available. The glitch is that it costs, conservatively speak-

ing, roughly \$2500. The recoil-spring assembly cannot be further disassembled, but is available for replacement purposes as a unit.

If judged in comparison to the price of a fully accurized M1911 these days, that price is right in the ball park—at least, it's not completely out of it. And unlike other, immensely more economical 9mm pistols, you can't improve the trigger on the Sig P210. It's a smooth-as-silk two-stage that breaks oh-so-cleanly at just under 3 pounds. I'll get to why this happens and why you can't rework it later on.

After firing a box of 115-grain full metal jacket 9mm When the pistol is so equipped, the magazine safety pushes the trigger bar down when the magazine (#3) is removed to disconnect the sear (#4), and the hammer (#5) cannot be released. In the event of incomplete lock-up, the slide (#6) pushes the

trigger bar down, thereby interrupting any trigger action, until the slide is completely in battery. If the hammer slips during manual cocking, it will be prevented from fully falling by its safety notch.

On the M1911, this is called the “halfcock notch.” ammo through it, though, I wouldn't want to change a thing. Before moving into field stripping, brush up on your arithmetic. All linear dimensions given here are in millimeters. One millimeter (mm) equals .03937 inch. Consequently, millimeters x .0393 = inches. (There will be a quiz on your newly acquired math skills in a moment.) Field Stripping Remove the magazine, check the chamber, and put on your eye protection.

Pull the slide back about 5 mm, push in on the slide stop from the right, and remove it to the left. The

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Sigarms P210-6 9mm Semi-Auto Pistol (Specifications subject to change without notice) 1 Slide 18 Stirrup Pin 33 Magazine Catch 49 Floor Plate Insert 2 Firing Pin 19 Stirrup Head 34 Pin for Magazine Catch 50 Feeder Button (.22 LR) 3 Firing Pin Plate 20 Lock Nut 35 Magazine Safety 51 Rear Sight 4 Stop Pin for Firing Pin (.22 only) 21 Main Spring 36 Magazine Safety Screw 52 Detent Ball 5 Firing Pin Spring 22 Double-Pull Lever 37 Right Hand Grip 53 Blade 6 Extractor (caliber specific) 23 Pin for Pull Lever and Sear 38 Left Hand Grip 54 Windage Screw 8 Extractor Pin 24 Sear 39 Grip Screw 55 Sight Base 9 Extractor Spring 25 Sear Spring 40 Slide Stop Spring 56 Elevation Screw 10 Rear Sight (standard) 26 Frame 41 Slide Stop 57 Rear Sight Pin 11 Front Sight (standard) 27 Trigger Bar 42 Action Casing Screw 58 Windage Spring 12 Barrel 28 Trigger Bar Pin 43 Trigger Stop Screw 59 Elevation Spring 13 Recoil Spring 29 Trigger 44 Safety Pin for Trigger Stop (front-sight assembly 14 Action Casing 30 Safety Lever 45 Magazine Casing not applicable to M210-6) 15 Hammer 31 Trigger Pin 46 Magazine Floor Plate 16 Hammer Pin 32 Trigger Spring 47 Feeder (follower) 17 Stirrup 48 Magazine Spring slide assembly is taken off to the front.

Get hold of the recoil-spring assembly at its rear and pull it out. This element cannot be further disassembled and is sold as a complete unit only. Lift the rear of the barrel, push it forward, then slide it back and out. The grips are held on by a single screw (#39) and are dovetailed into the front of the grip frame. After removing the screw, don't attempt to dislodge the grips from their front ends; you'll break them.

Once you get the screw out, place the frame upright on your bench and carefully swing each panel individually toward the front. Think of it as opening two doors—one to the left and the other to the right. Ready for your math test? The overall length of the P210-6 is 215 mm, its barrel length is 120 mm, rifling length is 250 mm, and trigger travel is 1.8 to 2.0 mm. Go ahead and convert all those dimensions to inches, please, before reading any further.

Detailed Disassembly The slide takes down like an M1911 with two exceptions: It has no firing pin safety; it has an extractor pin (#8). The pin is flared, driven downward to release the extractor (#6) and the extractor spring (#9), and should be restaked when reinstalled. A

DISASSEMBLY AND REASSEMBLY OF THE SIGARMS P210-6 CONTINUED

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.22-caliber conversion of the P210 is available for training purposes. It includes a slide, barrel, magazine, firing-pin stop (#4), and will fit any P201 frame. But we're not concerned with said conversion here. Nor are we concerned with the target-length barrel (#12) other than the rear, target-sight assembly (#51 through #59). Like all P210 rear sights, the base drifts in from the right and out to the left. However, the target-sight configuration calls for other measures.

Its elevation screw must first be backed all the way out, its rearblade assembly pivoted forward on the base pin, and the detent ball and spring removed and set aside. All this reveals the sight base. Then and only then can you drift the sight from its dovetail. In which direction? (A gold star if you answered "left to right.") Not so fast, class. When reinstalled, the target sight must be centered exactly. It left the factory in that condition.

So put an index mark on the sight base before you move it and a less conspicuous, easily removed index mark on the slide. Align the two marks when drifting the base back in and you'll be assured it is centered. From which direction does the drifting occur? (Another gold star if you answered "right to left.") Frame Disassembly The schematic here shows a European-style magazine-release system of the type activated at the bottom of the grip frame.

The P210-6, a more current version of the pistol, carries a button-type release. It's similar to the release on a M1911, and can be approached in the same manner for part replacement or detailed cleaning. It wears a thin slotted head; using a properly fitting screwdriver is mandatory. Under the hammer, which should be fully forward now, at the rear end of the frame is a screw (#42). It retains all action components (#14 through #24), and they'll come out as a unit once the screw is removed.

The safety lever (#30) comes out very easily. Turn it down past "F" on the left side of the frame and lift it off. (I have a rule: "Never defeat the safety system or systems on any firearm." The policy has kept me free of litigations and will do the same for you.) The trigger pin (#31) is pushed out to free the trigger (#29), trigger bar (#27), and trigger spring (#32) as a unit. Pin #28 on the schematic isn't present on the P210-6. I assume it appears on older models and wasn't omitted in the drawing.

Not omitted is the slide-stop spring (#40). Don't Any attempt to remove it will result in frame damage that can only be repaired in Switzerland. attempt to remove the spring; it's a riveted/press fit, and damage is sure to result—in which case the pistol will have to go back to Switzerland to have the inner frame reground. What remains

now is the action assembly. The only reason to take it apart is the rarest of happenings—breakage.

With that sole purpose in mind, then, undo the stirrup head (#18) and stirrup nut (#20) from the stirrup (#17). Drift the hammer pin (#16) to the right. There are two pins (#23). The upper one retains the sear (#24). The lower one retains the double-pull lever (#22). About that lever. Combined with the cross-ground sear/hammer engagement, which is considerable, it delivers the amazingly smooth, crisply breaking trigger pull mentioned earlier.

During the first stage, the sear moves along the lever to its disengagement point with the hammer. You can't possibly duplicate those engagement surfaces by hand. They can only be created in a secret corner of a Sigarms facility on computer-controlled, ultra-precise machine tools. Ah, you question, what if the action assembly becomes sinfully filthy? Well, after several thousands of rounds it might.

Leave it intact, spray its insides with brake drum or carburetor cleaner, follow that with a light shot of lubrication, and put it back in the pistol. Now, for next Christmas, I ask only for three things: anew Sig P210-6, a few thousand rounds of 9mm FMJ, and a lot more time to shoot. ■

RESTORATION

Gunstock Restoration and Refinishing: Tips from a Specialist

With some serious effort and attention to detail, most damage can be repaired, and stocks can be brought back to new or better than new condition.

BY BILL LARSON AUGUST 2005

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I am amazed at the poor condition of the gunstocks on most sporting firearms that come into my shop for restoration and refinishing. Typical damage includes cracked and split buttstocks and forends, deep scratches and dents, missing sections of wood, sling swivels installed off center, poorly fitted recoil pads, and various amateur attempts at refinishing. Repair and finishing materials are cheap, but time is expensive. So too is replacement of a stock with new wood—sometimes more than a firearm is worth.

Ignorance can also be expensive, so to keep costs under control, I'd like to share some thoughts and techniques that have proven to be practical and have satisfied my customers. Wood Finishes We've all heard of "in-the-wood" and "on-top-of-the-wood" finishes. Oils are "in" the wood. Spray finishes such as lacquer or urethane are "on top" of the surface. There are also two-part and epoxy-type finishes like you find on some Browning shotguns. This type of finish is better left to the manufacturer to restore.

Some of these finishes are very difficult to strip and require special spray booth and drying setups to achieve good results. If the wood is perfect and has good figure, oil finishes are very nice. They also make minor repair of small scratches somewhat easier. However, an oil finish will highlight old pressure dents and defects, so you should have really good wood to start with. Wood fillers and other "tricks" will not be hidden by an oil finish.

Sometimes I have to glue a broken stock back together or inlay missing sections of walnut and try to match the grain. Occasionally, I have to disguise a deep dent as a knothole in the wood. There are also cases where glass-bedding material will show at barrel channels and action inlet corners. In these cases, I recommend a darker walnut stain and a multi-coat varnish or urethane finish.

I believe that some reasonable degree of sealing against moisture is important for protection of the wood, and varnishes and urethanes do this best. When I apply an exterior finish, I usually compound it out very much like an automobile body shop would. The author uses a paint stripper and steel

wool and/or metal scrapers. After all the old finish has been removed, the wood is cleaned with detergent. finish the paint job on a fine car. This tends to add gloss to urethane and varnish finishes.

Although high-gloss finishes are harder to maintain, as they tend to show minor defects in reflected light, a high-gloss finish does look correct on some firearms. Some customers do not like a highgloss finish, so the final coat can be flattened with fine pumice and water to produce a lower luster. I feel the finish chosen should be appropriate for the style or period of the firearm. The Project Let's take a typical restoration job through from start to finish.

A customer comes in with a beat-up shotgun or rifle: "Can you fix this?" And, of course, he adds: "I don't want to spend too much money." (I use Brownells suggested gunsmith pricing guides, found in their catalogs, when quoting jobs.) First, always check the chamber and magazine. Every now and then alive round will show up. I go over the job with the customer and explain his options. I discuss things like new butt pads or recoil pads, length of pull

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adjustments, and accessories. I discuss a complete restoration including replacement of missing or damaged parts, polishing of metal parts, and complete refinishing with new black oxide or bluing, glass bedding of rifle barrels, perhaps gold plating triggers or parts on fine guns, and stripping and re-anodizing aluminum parts. I try to get a good feel for what type of finish, color, and tones the customer might prefer. Completed sample projects that I can show him really help here.

I don't want any surprises when the customer comes in to pick up the completed firearm, and neither does he. (When I hand it to him, I really enjoy it when his eyes get big and his face breaks into a big smile and he says: "Man, is this my gun?") I advise him of time frames to complete the work, the average being three to six weeks. I also tell him I will call if I run into unforeseen problems or need additional information to complete the project.

For this article, however, I'll stick with the stock work and wood-refinishing part of a typical restoration. The Procedure Always know what you are doing when you disassemble a firearm. If I have not done it before, I always look up the particular model in a shop manual and review the procedure. Do it correctly. Use the proper tools, stock-bolt wrenches, and gunsmith screwdrivers. Make a few notes, if necessary, or even take a close-up digital photo.

Tag or mark parts as required, bag them, and store parts safely; it will be awhile before reassembly. To remove old wood fin-

ishes, I use a commercial stripper. This can melt acrylic parts like grip caps and inlays that cannot be removed. These areas must be tightly masked off and edges that will be sanded will have to be buffed and polished and then masked off again prior to applying some stock finishes. Take this into consideration and plan carefully.

I use a large piece of cardboard with the edges folded up about 3 inches. I place this on my bench, and put a small pan of stripper and the stock in this box. I get out my apron, heavy-duty rubber gloves, and some eye protection. I include some medium-grade steel wool and a small strip of sheet metal to be used as a scraper. I lay the stripper on thick, inside and out with a brush, and let it do its thing. Give it time. I gently scrape or steel wool off as much old raised finish as I can.

Then I give it a second coat of stripper and repeat the scraping as required. Get into the corners, but don't cut into the wood with scrapers. Next I put about an ounce of a strong, general-purpose detergent into a laundry tray and fill it with warm (not hot) water. In goes the wood, one piece at a time. I use a nylon brush to remove and neutralize any remaining stripper. It is important to get the wood in and out of the bath in minimum time. Don't let it soak.

The warm water will start to raise a few dents and may also degrade checkering if left to soak too long. I then dry the wood with an old towel and blow compressed air into every bore channel and screw hole. Almost all of the old finish will be gone at

this point. Any minor spots that remain can easily be scraped or sanded off. I then get right into the dent-removal routine. I heat up a medium-sized soldering iron, and use a 2-inch double-folded square of cotton cloth, soaking wet.

I cover this with a small piece of aluminum foil. Place this stack over the dent, and move the iron around over the top. I use small patches so I can see what I am doing and get right over the dents. The idea is to make steam, and the foil keeps the steam next to the wood. Keep the cloth wet and move from one dent to another. Keep at it; most dents and some scratches can be lifted up at least to some extent.

Hang the stock sections on a wire in a warm ventilated area and let them dry for at least a day. (You can't sand wet wood properly.) The next step involves inlaying or replacing missing wood, like toe sections, and gluing broken stocks or split wood back together. I use a quality, waterproof wood glue available from woodworker's supply stores. If pieces of new walnut need to be added on, the actual joint must be a line-to-line fit. You'll need to carefully rasp, plane, and sand surfaces to achieve this.

You'll also have to try to match figure and grain direction. A good glue joint depends on the surface-to-surface contact of the

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pieces. You must clamp the joint to force the glue into the wood fibers to achieve good bond strength. I use rubber tubing, twisted wire, weights, tape, and various types of clamps. The tighter the clamping, the better the joint. I do a dry setup to be sure I can handle the final clamp up after the glue is applied. Pry open splits and work glue into all areas. Wipe off any excess with a wet cloth. Stock pins or hardwood dowels will sometimes be required.

Match all broken pieces as closely as possible when repositioning them. At least 24 hours of cure time is required before unclamping glue joints. If anew recoil pad is going to be used, I drill out and plug the old screw holes with hardwood dowels. Glue them in place. Have good control and a solid setup when drilling into the end grain of stocks. Drills tend to "hog in," so be sure the drill doesn't break out someplace where it shouldn't. Caution: Don't split stocks by forcing dowels in too tightly.

This is the time to adjust pitch and length of pull, if a thicker recoil pad is going to be installed, or perhaps anew forend tip on a rifle will be used. It is important to have the back or front of the stock flat and perpendicular to the center plane of the stock. Don't slap a stock onto a band-saw table and just lop it off. Rough cuts only. Use a protractor, and get equal angles on both sides of the stock.

Of course, butt stock pitch cuts and forend tip angles will not always be perpendicular to the stock centerline based on style, but we do not want recoil pads or tips installed

at an angle to the center plane of the stock. (That is, more rubber recoil pad showing on one side than the other after final sanding and fit up.) Use a small rasp and sandpaper block, working toward the middle. No chipped edges. I want a perfectly flat surface between the pad and butt stock or forend tip and stock.

Straight-line sand the new pad on a ground steel plate to get it flat. Some pads and plastic butt plates will soften and allow some bending or reshaping, if placed in very hot or boiling water. This would apply when it becomes necessary to fit pads to curved butts on contoured stocks on older-style rifles. Fish them out while wearing leather gloves and have at it. Go easy. This takes some practice. Do not try to bend a pad cold; it will probably break.

I belt sand excess pad rubber using one of the fixtures that is intended for fitting new pads to finished gunstocks. I then install the pad or butt plate to the stock, following the manufacturer's instructions. I hand sand it with the stock for a perfect fit. Carry stock contours right into the recoil pad all around. If I am going to rework metal parts, I can sometimes file and sand these with the wood—parts like trigger guards, tang legs on receivers, or related metal components.

Of course, all of these parts will have to be final sanded and polished prior to black oxide, bluing, blackening, or plating. This is also the time to correct improperly installed sling swivels on rifles. Move holes over to the centerline where they should have been

drilled in the first place. There is nothing that looks as crude as improperly installed swivels. Sometimes I have to enlarge a hole and machine and install a steel insert in the stock to get things where they belong.

When I drill holes for sling swivels I carefully locate them on the centerline of the stock and start with small pilot holes and perhaps install small-diameter gauge pins so I can check alignment and make corrections if required before the final hole diameter is drilled. Locations and distances of swivels from the butt or forend tip are very important. Sometimes a stock can be set up in a vertical mill, but be careful. The cheap angled drill jigs that are available have not helped me much with swivel installations.

I think a good eye is most important here. Next, I try to correct any stock contour problems, such as barrel channels with more wood on one side than the other, pistol-grip areas, comb heights, or obvious areas that are not correct. On rifles, this is about the time to start glass bedding, which is a whole other subject. Now you're ready to start sanding. I use from 100 grit down to 320, and down to 400 grit or even finer if an oil finish will be used. Use all the grits in between, or sanding scratches will show.

I use small rubber blocks, rubber erasers, small wood blocks, and just my fingers. Sand with the grain whenever possible. Don't get carried away with the coarser papers. You want to remove the minimum

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amount of wood, and you don't want to dig a hole trying to remove a dent. Sometimes a filler will have to be used. I add sanding dust to fillers. Fillers will probably show. This is unacceptable if an oil finish will be used. Sometimes a deep dent can be made into a knothole in the walnut with darker filler. Cuts with a fine, sharp blade can sometimes be put through filled areas and filled with black ink to appear as natural wood grain. This takes artistic experience. Practice on scrap wood.

Sand carefully around checkering to avoid damaging it. You will probably need to clean out boarderlines and sharpen up some diamonds later. As I move to finer grit paper, I will damp mop the wood with water and "de-whisker" the stock over a gas flame. (Don't set it on fire.) To detect sanding scratches, I use mineral spirits on a tack rag to dampen the wood. This will help to find sanding flaws. They will stand out better when viewed outdoors in daylight.

Remove all attachments, butt pads or recoil pads and set them aside. I will rework checkering as required at this time. I use a single line tool. I will not get into this area too far but it will not, however, stand up to much abuse—every little scratch will show. diamonds should be sharp pointed; use light pressure, get right into the corners of the pattern, and place your thumb ahead of the tool, no slips allowed. Hopefully you will be following the original pattern. We are just trying to clean things up here.

When you think you have it right, and you have taken careful measurements all over and checked contours with a steel rule or straight edge, and the stock is so smooth that you can hardly hold on to it and you can't find a single sanding scratch, you're ready to stain the wood. Staining I use penetrating-type stains; the thin kind with no fillers. I feel that stains with fillers hide color and figure. I use a toothbrush to brush the stain out of checkering.

I apply stain with a rag, work it in well across the grain, and wipe it off thoroughly. If a few minor sanding scratches show up at this point, it's possible to wet sand small areas with stain to remove them. Stain must dry for 24 to 48 hours. Don't start finishing before the stain is completely dry. Carefully mask off all checkering, carving or laser-cut detail in the wood. We will complete this later. Finishing For a varnish finish, I like semi-gloss interior/exterior polyurethane.

It's tough, clear, rubs out fairly well, and it can be repaired. I have used spar varnishes, but they tend to be a little on the soft side. Oil varnishes are harder to apply by hand and require thinning. Satin varnishes contain too much flattener and do not produce the degree of luster that I prefer. Fresh, new varnish works better, so get rid of the old degraded stuff.

The most important thing I have learned about varnishing is that a clean work area, thin coats, and following the manufacturer's instructions are very important. I have applied varnishes in various manners—brushes, rags, fingers, spray cans, and a few other

ways on interior bores. Always apply fast, thin coats. This will minimize runs, orange peel, streaking, and bubbles. If small imperfections appear, just leave them alone and deal with them when that coat dries.

I very lightly scuff sand between coats with fine sandpaper to remove minor defects. I don't like steel wool. I have occasionally used #0000, but look out for wool fibers stuck in the finish and remember to wipe down with naphtha before recoating. Keep the edges of masking tape tight. Sometimes strips have to be replaced between coats and scuff sanding. I get finish into all interior areas of the stock with the first few coats.

The objective is to build up a fairly heavy even thickness of finish on the exterior surfaces. A lot of it will be rubbed down, and if you break through the surface, it's back to the varnish can. I will try for at least six good coats. Let it dry and harden, as it will be easier to rub out after a few days of curing. I will then lightly wet sand with 600-grit wet-or-dry paper, followed up with a fine pumice rubdown using a damp cloth. Again, go easy here; don't cut through the finish. Next is the compounding.

Automotive rubbing and finishing compounds seem to work, but, once again, do not be too aggressive. I use a slightly damp soft cloth and Meguiars #9 Swirl Remover (available in most auto-supply stores or from auto body shops). I polish and final buff by hand with a very soft flannel cloth. Compounding also works well on plastic parts. If the finish shows too

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much gloss, a very fine, damp pumice rub will tone this down. I then remove the masking tape from the protected areas. A minor clean up with the checkering file on borders will be required if some finish got under the tape. Do not let that tool slip out of borderlines. For checkered areas, I use a single coat of thinned finish, and perhaps a few drops of linseed oil with a drop of Japan drier (available at woodworkers' stores), brushed into the pattern with a toothbrush. I then quickly wipe off any excess finish.

You don't want a buildup of finish in checkered, or carved areas. Let everything dry before reassembly. Lacquer finishes should be sprayed on. Recoat times are critical, and between-coat sanding will probably not be required. Having the correct equipment for the job is critical for spray painting. I have used varnish in spray cans with some success. It takes a little practice. I have made temporary spray booths by encircling an area with polyethylene sheet like a large shower stall.

Usually, a single stock project requires such a small amount of finish that using powered spray equipment involves more work to clean everything up than I feel it is worth, especially if time between coats is required. Oil Finishes Oil finishes are easy to apply. Linseed oil by itself offers very little protection, and Danish oils are way too

thin for gunstock finishes. Pure tung oil will work, as will a few commercial stock finishes. But we can still do better.

In a very small paper cup, I mix a teaspoon of boiled linseed oil, a teaspoon of natural tung oil, 1/2 teaspoon of turpentine, 1/2 teaspoon of oil varnish (not polyurethane), and three or four drops of Japan drier. Stir this up, and with your fingers or a small lint-free cloth rub it into that perfectly, super-smooth-sanded, final-checked, stained, and thoroughly dry stock. The first coat can go into the stock bores and the checkering, but when applying additional coats, stay out of checkering.

Rub it in until it disappears in the wood. Brush out all checkered areas. Then throw the remainder in your metal disposal can. You must mix anew, small amount for each coat. As the Japan drier will oxidize the oils, this mixture should not be used after a couple hours. Let each coat cure for at least 14 hours. Early coats go on easily. The third and forth coats get more difficult. You must cut back on the oil varnish and dry times must be longer. Wood pores will quickly fill up and a gloss or luster will develop.

You can't get into too much trouble with this stuff if you let it cure or dry between coats. Defect areas or streaks can be cut back with very fine sandpaper and recoated. Also if any sanding scratches appear, it is possible to wet sand with oil to remove them. Cure times can be 48 hours or longer. Don't recoat if fairly heavy pressure

with your fingers will not allow them to slip easily over the finish. If you let this finish cure for a week, it can be rubbed out a little with fine pumice.

This finishing process should stop as soon as all wood pores are filled. If you build finish up above the wood surface, it can get a little gummy looking. The small amount of oil varnish will seal the wood better than pure oil. Remind your customer that oil-rich finishes require a little upkeep once or twice a year. Don't use oil varnish in the maintenance coats—just a little boiled linseed and tung oil, a drop of mineral spirits, and a drop of Japan drier.

Very thin coats can usually be rubbed in by hand without disassembly of the firearm. Stay out of checkering and away from rubber recoil pads. Wipe off any excess oil from metal parts, and let the firearm stand in a safe corner to dry overnight. Never use wax over an oil finish. Conclusions There are a great many wood finishes on the market. Many of the so-called "wonder" wood finishes and stains are just advertising hype and contain lots of high-priced thinner.

They may be all right for your wood-cased wall clock, but they may not make a good gunstock finish. I believe we have to continue to do research and to try new products, but my procedure is to test all finishes first on scrap wood. The most important piece of advice I can give on the subject is: Don't try to cut corners or rush through the job if you want a quality finish. ■

MEASUREMENT & INSPECTION

Making and Installing An External Hammer Safety

Sometimes creative measures must be taken to ensure the safety of a firearm. In this case, a failing rebound safety was corrected simply and inexpensively by installing a custom-made automatic safety.

BY NORMAN E. JOHNSON AUGUST 2005

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Original caption: Right top: These parts comprise the automatic-safety attachment for an external hammer. The modified Conetrol scope base (left) has a notch cut to accept the safety arm.

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Original caption: Right bottom: With the scope base mounted to the gun and the safety arm attached, note how the notch in the safety arm blocks the forward movement of the hammer in the uncocked position, and arrived at a principle that was functional and easily adaptable to this particular gun—and could be adapted to many other similar guns.

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In the case of this Stevens Model 107B shotgun, the normal hammer-rebound safety failed to provide a positive safety for the gun. That is to say, if the hammer, while in the uncocked position, were struck with a loaded round in the chamber, the gun could discharge. Though the possibility of such an occurrence may be unlikely, I considered measures for an added positive safety so the loaded gun could be carried without any possibility of an accidental discharge should the hammer be struck.

I concluded that, in the design of such a safety, it must be fully automatic. It must not interfere with the loading, firing, or unloading of the firearm in any way as it provides a positive, automatic safety mechanism. Designing and Making the Safety I contemplated a few different options for such a safety mechanism,

The screw attaches the arm to the scope base, and the arm blocks the hammer.

In mounting the scope to the receiver, I elected to use a pair of Conetrol scope bases and Conetrol horizontal split rings for a most rigid mounting system. The laterally opposing cone screws at the sides of the bases provide an excellent means of rigidly holding each ring assembly in place and offer side-to-side zeroing for the scope as well. In this mounting application, I allowed for the rear scope base to be extended beyond the breech-face/barrel juncture by about 3/8-inch—far enough to

MAKING AND INSTALLING AN EXTERNAL HAMMER SAFETY CONTINUED

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Original caption: Left top: With the hammer in the full-cocked position, the safety arm is lowered with its beveled tang below the top of the hammer. Left bottom: As the hammer falls, the upper aspect of the hammer strikes the beveled tang of the safety arm, flipping it upward. The hammer is then free to move into the firing position. the trigger is pulled, there is a means for preventing hammer engagement with the safety.

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attach the pivot point for the new safety arm. The concept of the safety is quite uncomplicated. An arm attached to the slotted tip of the scope base, about 3/4 inch in length, extends over the external striking face of the hammer. The front of the arm has a hole at the end matching the lateral hole drilled in the slotted scope base. I used a 6-32 socket-head screw, and threaded one side of the through-hole in the base for positive attachment.

This safety arm hangs freely and has an underside notch which falls and mates with the square forward face of the hammer. In this position, it allows but a few thousandths' tol-

erance between the firing pin and the upper impact surface lip of the hammer. The hammer returns to this precise position following striking of the firing pin each time the gun is fired. It is then in the automatic safe position.

THEN, DURING NORMAL USAGE, AS THE HAMMER IS COCKED AND

This is accomplished by the special tang on the rear portion of the safety arm extending out over the hammer. This tang is beveled at its lower rear aspect. As the hammer falls during firing, the upper forward edge of the hammer face engages the beveled part of the

arm, flipping it upward. Inertia keeps the arm elevated as the hammer passes beneath the safety notch. After firing, it again falls into its safety position.

The extended arm does not interfere with loading the rifle or removing a partially extracted cartridge from the chamber. Conclusion There are undoubtedly many ways to add an automatic safety to a gun. This method, however, is simplicity itself, and has proven to be a most positive safety feature for this gun. The installation required less than a dollar's worth of parts and materials, and involved but two hours shop time. ■

PEOPLE & COMPANIES

Smoothing the Taurus Double-Action Revolver

Since the company produced its first revolver in 1941, Taurus products have continually improved. Still, any revolver can benefit from the hands-on attention of the skilled and patient gunsmith.

BY ROBERT K. CAMPBELL AUGUST 2005

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Over the last generation, I've watched the steady improvement of handguns from Taurus International, the well-known manufacturer of double-action revolvers and semi-automatic pistols. These guns were a good value 30 years or so ago, when they sold for about two-thirds the price of an American-made handgun. But, today, these guns can stand on their own merits against any handgun, regardless of price. I often carry a .44 Magnum Taurus in the hunting field and carry one of several compact versions for personal defense.

That's as high a compliment as I can give. When the practiced eye looks over Taurus revolvers, it's obvious that they are modeled after the Smith & Wesson. There's nothing wrong with that; the Smith & Wesson revolver, Colt automatic pistol, and Colt Single Action Army revolver clones and copies have given work to quite a few factories over the years. But Taurus has seen fit to incorporate changes that make

their handguns quite different from those coming from Massachusetts. On the whole, I like these changes.

Let's take a look at some of the differences, starting with the lockwork. Most Smith & Wesson revolvers have a direct-impact hammer. In other words, the hammer features a firing pin mounted in the hammer that falls directly on the cartridge primer for ignition. The most significant difference in the Taurus is that the firing pin is frame-mounted. The Taurus revolver shown here uses a frame-mounted firing pin and transfer-bar ignition system.

In this system, the bar lays over the firing pin and protects it from a blow by the hammer. The hammer simply can't connect with the firing pin, no matter how hard the hammer is impacted from the gun being dropped or other accidental strike. As a result of this improvement, Taurus has been

able to eliminate the rebound slide. There is a spring-loaded trigger-return plunger that pivots, but no rebound slide.

In the Smith & Wesson, the rebound slide is necessary to prevent the direct-impact hammer from firing the gun if you were to slip while cocking the gun and release the hammer prematurely. Another difference incorporated into Taurus revolvers since 1999 is that there is no locking point on the ejector rod. The old system was the cause of more than one revolver tieup in my experience. I'm not unhappy to see it go. Additional lockup is guaranteed by a spring-loaded indent in the crane that bears against the frame.

This gives the gun sufficient rigidity for good accuracy. This has kens back not only to the Smith & Wesson Triple Lock, but numerous custom efforts. While the Taurus revolvers differ from the S&W in several respects, in evolutionary terms, they share a common ancestry and

SMOOTHING THE TAURUS DOUBLE-ACTION REVOLVER CONTINUED

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That is simply a nuance of distribution. the same basic principles apply. The revolver works in a straightforward double-action manner. The trigger is pressed and the hammer moves, which compresses a coil spring. (Once, lever type-springs were used.) The cylinder bolt falls away from the cylinder notch at this point, and the hand, which is mated to the trigger, moves the cylinder. The cylinder bolt comes into play and holds the cylinder steady for firing.

The sear on the trigger can hold the hammer in a fully cocked single-action mode if desired, or the trigger is simply pulled through and the revolver fires. The compressed spring's release-lever or coil spring, depending upon the revolver generation, propels the hammer forward to fire the revolver. At one time, the rebound lever forced the hammer back after firing, but with newer designs the transfer bar simply returns to its protective position.

The Taurus will respond to the same general gunsmithing skills needed to smooth older-generation revolvers. I've found that in the newer revolvers, the steel used is up to standards, and will take a good fit and polish. In fact, if better steel is used elsewhere, I have not seen it. The early guns were often rougher on the inside than the

outside, but the steel was not of poor quality and they will indeed take a good fit and polish.

It seems to me that Taurus saw that consumers were willing to pay for quality, and they upped their standards, although we were already getting what we paid for. You can still purchase a pretty bare-bones 4-inch blued Taurus .38 at a price that is even better in 2005 dollars, but it is much better made, fitted, and polished than anything offered 30 years ago. So, you can file and polish modern revolvers and obtain and retain a good slick double-action trigger.

You may void a generous warranty, but that's never stopped a shooter before. I'll briefly go over the steps I've taken to work over my revolvers. They've responded well, and the work is straightforward revolver mechanics. But the Taurus does have differences from the Smith & Wesson, and these have to be understood, just as the modern Taurus differs from the older-generation revolvers. Improving Single-Action Triggers For the most part, the single-action compression of modern double-action revolvers is acceptable.

I've put the RCBS scale on several Taurus revolvers, and 2.5 to 4 pounds is normal for single-action compression. For a revolver

intended for defense work, this is more than acceptable. However, I once owned an otherwise decent Taurus Model 66, the pre-669 Magnum, which featured a single-action trigger to rival the double-action's weight! (I should point out that I've seen this but once.) The cure was relatively simple. Take a look at the single-action notch in the action. There is a slight bevel in the notch.

I lightly stoned this section, being sure not to destroy the factory angles, and improvement was immediate. I think that sometimes when we come across a really bad trigger, we tend to be more enthusiastic with stoning than we should be. Oddly enough, I've found that the amount of correction needed doesn't necessarily correspond to the initial pull weight. In other words, a very bad trigger action may take about the same effort as one that's decent to start with, in my experience.

The standard improvements that apply to any double-action revolver apply equally to the Taurus. These improvements to the trigger action are simpler to do with a stainless-steel gun, since polishing and chamfering will likely require a refinish of a blued gun. I really prefer blue steel to other finishes as far as

SMOOTHING THE TAURUS DOUBLE-ACTION REVOLVER CONTINUED

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appearance goes, but for practical, hard service, I believe the stainless revolver is clearly a better choice. As for the revolvers used here, I settled down on the bench rest and confirmed that each would group five rounds of quality ammunition into an average group of 2 inches or so at 25 yards, which made them worthy of custom work. In fact, the 6-inch-barrel Taurus 669 .357 Magnum revolver placed five rounds of Federal's 180-grain jacketed hollowpoint "deer killer" into a group of less than an inch at 75 feet.

That's good enough for me. Like many Taurus revolvers, the gun is more accurate with jacketed ammunition than with lead, but lead-bullet He does not recommend cutting these springs for a lighter action. Magnum primers must be stronger than average to withstand Magnum pressure, and require full-strength springs to propel the hammer with sufficient force. accuracy is acceptable nonetheless. To perform this work, simply disassemble the revolver. Carefully remove the sideplate screws.

I use the handy Chapman screwdriver set as I have for many years. I set the screws carefully in order on the bench—they're not all the same. Carefully, carefully remove the sideplate. The plate can be warped by a ham hand, so gently tug it out of its slot in the frame. If the sideplate is warped, the action can't work properly, as is most often shown by a hand out of line. The standard revolver action job requires patience, but can be done relatively quickly. First, cock the gun to the single-action position.

Place a small pin—I often use a small Allen wrench—in the hole in the mainspring and in the trigger-spring center pin. Release the trigger and the two pins will come out. Don't allow any springs to escape. (This is one reason we wear safety glasses when working with revolver springs.) I polish these pins until they have a pleasing appearance, and they will be much smoother in action. Taking the hammer out, we find the hammer-axis pin. This part is often overlooked, but can be a drag on the action.

I polish the hammer-axis pin as well. It doesn't take very long and adds to the action's smoothness in the final chapter, I am certain. On most Taurus revolvers the transfer-bar hand and trigger come out as a group. I don't get ambitious in polishing the hand—bad things occur when the angles are broken—but I do give it a once-over and check for burrs. Now is a good time to apply a quality lubricant to the moving parts. The trigger's sharp edges should be addressed at this time.

The mating surfaces of the hammer and trigger will be shown by high wear on stainless guns. If not apparent, the parts can be smoked or painted lightly and the gun reassembled, and the contact or load-bearing surfaces examined. These surfaces can be lightly, smoothly polished, with all surfaces remaining even and no original angles broken. This is the heart of the action job. To keep the surfaces smooth and even is the main goal.

The sideplate will occasionally have excess roughness, and this is most common with stainless guns. After all, they don't have to be polished to be blued, and tool marks don't hurt anything when they are hidden. But, of course, nothing is hidden from a pistolsmith! It's a good idea to smooth out any glaring errors in polishing of the sideplate as delivered from the factory. It's fairly common for the hammer to bind on the sideplate or frame. Again, a light polish will cure this problem.

Occasionally, the cylinder release will protrude and bind on moving parts. Once discovered, careful polishing will keep the cylinder release from causing trouble. Cylinder drag is often demonstrated in revolvers by a line around the cylinder where the bolt has etched its signature across the cylinder. This happens when the bolt fails to release after the hand has begun to turn the cylinder.

I've examined revolvers that have exhibited this defect for years, and the guns always worked, but it's not a good thing and can be corrected easily. The standard cure is to slowly actuate the action and observe to see if the bolt drops clear as it should during the action phase of the cycle. If it does not, polish or stone the rough edges of the hand until the bolt clears as desired. Only the section that enters the cylinder needs to be stoned.

However, it is sometimes helpful to polish the extension of the trigger where it meets the bolt as well. The watchwords in all action work is "smooth and slow." The pull

SMOOTHING THE TAURUS DOUBLE-ACTION REVOLVER CONTINUED

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weight of the double-action trigger may not be reduced much on the scale, but the perceived smoothness will be impressive. Any revolver can be improved in this manner, but the Taurus responds especially well. Cylinder and Recoil Shield Mods With the sideplate and the screw holding the cylinder removed, the cylinder simply pulls from the frame along with the cylinder stop and plunger. Place them aside in a box or plastic bag. The first Taurus 66 I worked on had a fairly rough recoil shield.

At certain angles of fire, the case rims actually bound on the recoil shield. I didn't repair it (the owner sent it back and it was repaired under the warranty), but I have addressed this issue several times on Smith & Wesson revolvers. And it doesn't hurt to do the same with the stainless Taurus. I simply use abrasive cloth and metal polish to give the recoil shield a good polish. I

didn't remove all the tool marks; they were few but noticeable. Nevertheless, the result was a nice improvement.

I own a nice little Smith & Wesson Model 60 with chamfered cylinder chambers by the Action Works. It turned out so well, I elected to do this operation with the Taurus Model Careful polishing of the stop can put an end to this dragging. 44. This is one of those modifications that you don't realize works so well until you have used a revolver so modified. It's fairly simple and aids in loading the revolver, especially when loading quickly with speedloaders.

The cylinder chambers are cut at a relatively sharp angle, about 90 degrees. Breaking this edge helps more than one would think when loading the revolver with a speedloader. Blunt bullets tend to catch on this sharp edge. There are several ways to polish the bevel. (We're just breaking the sharp edge and no more.) A Forster case

trimmer with appropriate pilot wrapped in lapping compound will do the trick, and so will a dowel of about .380 inch, also liberally swathed with lapping compound.

You will have a very nice, neat chamfer that makes for more efficient loading. The Model 44 is my all-purpose, do-anything, go-anywhere revolver. I wouldn't compromise its reliability. I have no doubt that, straight from the factory, it would have kept going for many years and provided good service. But the simple work performed on this revolver has given me greater confidence and enhanced my ability to deliver the payload.

When that payload is a 270-grain Gold Dot bullet at over 1,100 fps, we're talking real power. The Taurus M44 is much more pleasant to use after a bit of smoothing, and I'm able to fire it more accurately in double-action. And that is what this type of work is all about. ■

PEOPLE & COMPANIES

Troubleshooting a Troubled Carbine

This new Rossi M92 Puma Carbine, chambered for the powerful .454 Casull, left the factory with some problems that should have been addressed there.

BY ROBERT DAMOTH AUGUST 2005

ORIGINAL PP. 18-22

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This Brazilian-made version of the Winchester 1892 carbine decided to call it quits after just a few shots. The carbine was new, and this happened shortly after being removed from its carton. The carbine in question is chambered for the .454 Casull cartridge, a relatively new chambering for this import. Although the 1892 has strong twin vertical locking bolts, the .454 is still a very powerful cartridge for this action design—the word “scary” enters my mind—developing some where in the neighborhood of 65,000 psi.

But let us not dwell on that thought at this time. Someone, I believe, was asleep at his station when he let this carbine pass final inspection and hop a boat for the U. S. It was, in fact, my brother who just had to have this carbine as a stable mate for his Taurus Raging Bull in the same chambering. As it turned out, I was present when it came time to sight in the Rossi. Problems arose almost immediately, after firing only three or four shots.

The problems were mostly feeding related, but included one or two others. Consequently, the Rossi was returned to the place of purchase and from there to a warranty repair station. Fast forward six or seven weeks: The Rossi carbine was re-

turned to its owner and—you guessed it—was not repaired, and came with no explanation as to why.

This brings us to the purpose of this article, which will deal with not only this little carbine’s problems, but might also be helpful for anyone having similar problems with other lever-action imports. Analysis/Repair Having been present at sight-in gave me somewhat of ahead start on the problems with this firearm, in that I was able to see first-hand exactly what was taking place and what wasn’t. One of the first problems to surface was failure of the cartridge to mount the carrier.

The carrier had failed to reach its lowest point to allow the cartridge to mount. At this early stage, it could not be visually determined what was causing this to happen. Additionally, we had a problem with the cartridge rims jamming between the cartridge guides. Sometimes this problem can be traced to loose guide screws—not so in this instance. Added to this was a magazine follower that was protruding into the area where the carrier resides.

These are not all of the problems that plagued this little carbine, but I determined that attending to these problems should get

the Rossi up and running. I’m going to skip over the disassembly sequence for the Puma carbine, since this information can be found in the appropriate NRA guide to firearms disassembly, and just stick to addressing the problem areas. This Puma model has two new features that will not be found on earlier models.

They area redesigned magazine tube, and a firing-pin locking safety located at the top rear of the breechbolt. Another point to watch for: Most of the pins in this model are directional. Looking closely, you’ll see that one end of the pin has a “star” appearance. Drive from the opposite side. The first problem I’ll address is the magazine follower. This was moving past the cartridge stop, intruding on the carrier. This should not happen, and required disassembly of the inner magazine tube.

The tube must be supported well—a block of wood will work, and you must remove the magazine plug by removing its retaining pin. Look at the pin ends 45 LC and .357 Magnum. Problems have been reported, however, with early production Pumas in .454 Casull.

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1 Barrel 2 Front Sight 3 Front Sight Pin 4 Upper Band 5 Upper Band Screw 6 Magazine Plug 7 Magazine Plug Screw 8 Magazine Spring 9 Forend 10 Lower Band 11 Lower Band Screw 12 Magazine Tube 13 Magazine Follower 14 Rear Sight Assembly 15 Elevator before driving it out; I drove mine right to left. The cap is under spring pressure; control it. Now you can remove the magazine spring and the follower. The follower in this model was a pretty piece of yellow plastic, but not something I would consider to be very durable.

After it rolled off the bench and onto the floor, I accidentally stepped on it. Oops! It didn't matter much, though, because 16 Receiver 17 Carrier 18 Carrier Stop 19 Carrier Stop Spring 20 Carrier Stop Pin 21 Carrier Screw 22 Saddle Ring 23 Saddle Ring Support 24 Trigger 25 Trigger Pin 26 Lower Tang 27 Trigger Spring 28 Trigger Spring Screw 29 Lever & Breechbolt Pin Hole Plug Screw it had to be replaced anyway. The follower that was supplied from the factory was not manufactured to the correct dimensions.

The raised belt on the forward section of the follower was too narrow. (See the arrow in the photo at the top of page 21.) This belt engages the crimp at the end of the magazine tube, as can be seen in the photo, to hold it at the correct location within the tube.

The belt being too narrow allowed Rossi Model 92 Lever-Action Carbine (Specifications subject to change without notice) 30 Cartridge Guide, Right 31 Cartridge Guide Screw 32 Spring Cover 33 Spring Cover Screw 34 Finger Lever 35 Friction Stud 36 Friction Stud Spring 37 Friction Stud Stop Pin 38 Locking Bolt, Right 39 Locking Bolt, Left 40 Locking Bolt Pin 41 Locking Bolt Pin Stop Screw 42 Cartridge Guide, Left 43 Cartridge Stop 44 Cartridge Stop Joint Pin 45 Cartridge Stop Spring 46 Ejector 47 Ejector Spring 48 Ejector Collar 49 Ejector Spring Stop 50 Ejector Spring Stop Pin 51 Extractor 52 Extractor Pin 53 Breechbolt 54 Firing Pin 55 Firing Pin Stop Pin 56 Lever & Breechbolt Pin 57 Hammer 58 Mainspring Rod 59 Mainspring Rod Pin 60 Hammer Screw 61 Mainspring 62 Stock 63 Buttplate 64 Buttplate Screw the follower to extend too far.

The follower in the photo is made from aluminum bar stock to the correct dimensions. Keep in mind that this condition can be readily detected upon close inspection. Barring some kind of damage to the tube itself, this is the area to check. The follower should stop just short of the cartridge stop, which is pinned to the forward end of the left cartridge guide.

TROUBLESHOOTING A TROUBLED CARBINE CONTINUED

ORIGINAL PAGE 21

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The next problem could not be readily detected with a visual inspection until the carrier was removed from the firearm. The carrier was not reaching its lowest point to pick up the cartridge being released from the magazine. If and when it did pick it up, the cartridge rims began jamming up at the base of the cartridge guides. I'll start with the carrier problem first. After removing the carrier screws, the carrier is worked to the rear of the receiver and out the open back.

When I reached the point where the carrier stop had lined up and engaged the left carrier-screw hole, my rearward progress came to an abrupt stop. Using a 1/8-inch punch, I attacked it at the opposite side of the hole, being careful not to damage the screw threads in the receiver. Now, I'm not a weak man, but getting the carrier stop compressed enough to release its grip in the hole was a chore. The carrier-stop spring was very strong, to say the least.

Once the carrier was removed, an inspection of the inside of the receiver could be made. Refer to the photo at the top of page 22. Looking through the loading port at the inside left receiver wall, the two parallel

furrows milled into the wall determine the distance that the carrier travels up or down. Note the trench that the carrier stop has cut into the receiver wall between the furrows. I personally have never seen this happen before, at least not to this extent.

I'm not a metallurgist, but I'll venture a guess that the receiver has been heat treated for shock (rather soft), while the carrier stop has been treated for wear (very hard). This is not a good combination for this application. You can also see the metal shavings that this was creating. One solution to this problem would be to case-harden this area, and I suppose it could be done, but it would be very hard to reach.

Thinking back to the difficulty I had with the carrier stop and its strong spring gave me another idea that didn't involve heating the receiver. Take down of the carrier stop was in order. Driving out the directional carrier-stop pin and controlling the stop, I removed the stop and its spring. I was banking on this spring being a lot stronger than it needed to be. You've probably figured out by now where I'm going with this. Next I retrieved my Brownells master spring kit.

These springs are ready to be put in service. I chose one that matched the diameter of the one furnished, only half as strong, and cut it to length. This spring has to apply a great deal of force. The carrier should move smoothly without a lot of friction. It should also not cut a trench! I was betting on this as the cause of the carrier failure. Before I reassembled, I deburred the stop hole with a piece of emery cloth, also polishing the tip of the stop.

I cleaned up the burrs at the trench in the receiver and gave it a little polish. I also put a little dab of gun grease on the spring on reassembly of the carrier stop. As you can see in the photo at the bottom of page 22, the carrier-stop spring was not the only modification that the carrier received. (Now we're coming down the home stretch.) The cartridge rims jamming in the cartridge guides can sometimes be traced to loose guide screws, but not in this instance.

First off, the Model 92 has an action that is extremely cartridge-dimension sensitive. Com

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paring the 45 Colt cartridge to the .454 Casull, we find that they share the same rim diameter of .512 inch, but the overall length of the Colt cartridge is 1.600 inches, while the Casull is 1.770. A difference of .170 inch might not seem like much, but to this action, it is. Also keep in mind that rim diameters will vary from one manufacturer to the next. The rim should line up with the guide grooves before it starts to climb the slope, and make light contact with the guides, evenly and without binding.

Guide grooves should be slick, not rough, and the ejector face should be slick. The guide grooves on this model were rough, and polishing was in order. The ejector face got the same treatment. The front slope on these guides were a little steep, in my opinion. Trying to change the slope angle with a file would be risky. This solution may not be elegant, but it works. because the width of the groove is also critical. I had to find away to change the angle of the cartridge being fed into the chamber.

This is where the overall cartridge length becomes important. Remember that .170 difference in overall length? The cartridge pitch was great enough that the nose of the bullet was striking the top of the chamber mouth. A little experiment was in order

that called for reassembly of the firearm. I cut three strips of duct tape and started to build up the top of the carrier. The duct tape was .008 thick.

I placed two strips on top, I also placed a strip on top of the carrier-cartridge stop to shift the cartridge forward a bit. Loading a dummy cartridge into the mag, I gave her a try. Lo and behold, she chambered with no difficulty. To make sure it wasn't a fluke, I repeated the exercise several times. Well, what have I managed to do here?

What I believe happened is that I raised and shifted the cartridge enough to where it engages the guides a little higher on the slope, thereby Here, the carrier stop has cut a "trench" into the receiver wall. decreasing the pitch of the cartridge. I wanted something a little more permanent than duct tape. Referring to the photo at the bottom of the page, you can readily see what was done here. What I used was steel shim stock, overlapping two pieces cut to size, .005 on the bottom and .010 on top.

These could be sweat soldered in place, but I chose to glue mine with Acraglas epoxy, a very strong bonding agent available from Brownells. To do this, you have to clean the top surface of the carrier well, removing all

bluing before soldering or applying epoxy. The forward edge must be tapered so the cartridge rims don't hang up. The chamber mouth on this carbine had a very sharp edge, and bullet noses will hang up on this.

Occasionally you'll run into one of these actions that will need adjustment for the shell you're trying to feed it, no matter what the caliber. This Puma still had a couple other problems that needed to be taken care of. The machining on the bolt face looked like it had been done with a dull cutter—metal chips and burrs galore, and then there was the brass-eating extractor that rendered the brass useless. But these matters were relatively simple to cure.

Conclusions The Winchester 1892 was noted for its reliability, as long it was fed the correct fodder. Stray too far away from its cartridge-specific dimensions and you'll run into trouble. The Rossi Puma M92 that I worked on—a Winchester clone—has been back in service for a little over a year now, with no more complaints. I suspect that this .454 version of the carbine was of early production. Even so, I don't think it should have been shipped in that condition.

Then again, if all firearms were perfect, there would be no need for gunsmiths. ■

PEOPLE & COMPANIES

Reader Forum

BY AMERICAN GUNSMITH EDITORS AUGUST 2005

ORIGINAL PP. 23-24

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Winchester 97 Barrel Removal I've got a 97 Winchester in my shop and I am having trouble getting the magazine tube to slide forward. The tube rotates and feels like it unlatches, but it refuses to slide forward so I can remove the barrel. Am I missing something, or is there is a "trick" to getting them to move. Thanks. Steve Culver The trick is that the barrel, magazine tube, and action slide are removed from the receiver at the same time. We can't be sure of what you're doing or not doing to let it happen.

There are complete disassembly instructions for the M97 in Gun Digests' book of disassembly/reassembly for shotguns and in the NRA Guide to Disassembly for rifles and shotguns. Double-Nine Assembly I am in need of assembly instructions for a Hi-Standard "Double-Nine Convertible," in particular, the trigger-return spring and hand spring. Thank you.

Wayne Ross Having no printed resources on the Hi-Standard Double-Nine, because there are none, we spoke with one of the company's former gunsmiths who dates back to the great Hamden, Connecticut, manufacturing days. Hopefully, what we learned will help you. After you swing out the cylinder, you'll see a small hole up near the front end of the frame under the barrel. In there is the ejector-rod latch housing plug. We're told it has a plunger. Depress the plunger with a small tool and detach the rod from the frame.

The crane and cylinder can now be separated from the frame. Under the cylinder are two retainers. The front one is a pin; the rear one a screw. Remove them both and the grip assembly can be separated from the up-

per frame. The screw you just took out is the hammer pivot, so you can lift the hammer assembly out. The trigger-return spring and hand spring are retained in the trigger. The springs you mention are held in the trigger by a single pin.

Our source mentioned that the Double-Nine had some recurring problems with its hand being worn, thereby wrecking the timing of the revolver and causing misfires. If you have that problem, and are unable to refit anew hand, let us know and we'll put you in touch with that ex- Hi-Standard gunsmith. Firing-Pin Tool?

Perhaps you could refer me to a source for the screwdriver-type of firing-pin tool I need to unscrew and replace firing pins in .45 cal R&D cylinders I have (1860 Army .44, Uberti Dragoon .44, 1851 Navy .36). I want something with more precision than simply trying to grind a groove into the end of a screwdriver. Any leads would be appreciated. Rico Nance You are speaking, we trust, to R&D Conversion Cylinders for the revolvers you mention. The tool required is not a screwdriver.

It's a nipple wrench exactly like the ones used to install and replace nipples on blackpowder rifles and handguns. In the R&D conversion, the firing pin is contained in the nipple, and both are mounted in the cylinder back plates used in the conversions. In our opinion, the pin and nipple should be replaced as a unit. Stevens Barrel Repair I bought an old Stevens Model 15 in very bad shape for parts. The barrel-lug screw was broken off.

In trying to remove the broken screw end, the drill tip penetrated the barrel with a pin hole. Will this cause problems when firing

it, if so is there any way to plug the hole? I was thinking about something like JB Weld.

Thanks You didn't mention the caliber of your Stevens, but a hole in the barrel will allow propellant gas to escape regardless. If memory serves us correctly, the barrel-retaining screw in a Stevens is located just forward of the chamber, and we therefore suggest you rid yourself of all thoughts of using epoxy to fill the hole. You're no doubt familiar with the blind screws used by manufacturers to "fill" scope-base mounting holes they've pre-drilled in their rifles.

If you managed to remove the end of the barrel-retaining screw, and without intruding further into the bore, widen the pin hole to accept one of these blind screws. Turn it fully into the opening and back it up with a fresh barrel-retaining screw. In the future, you might want to use a depth stop on your drill bit and avoid the problems of invading a rifle's bore. Star Spring I want to install anew Wolff recoil spring in a Star BM. The BM captive recoil-spring unit has me baffled.

From everything I can see, the guide end plate is threaded and screws onto the guide rod. I can see no evidence of Loctite or staking, but attempts at unscrewing haven't worked so far. I have it stored threaded-end up, with Kano right now. Any advice or tips? Michael North From what we can see on a schematic of the Model BM, the end plate doesn't screw on the recoil-guide rod. What does screw on is the guide washer. Apply heat to the guide washer to break any bond that might exist.

BE EXTREMELY CAUTIOUS WHEN USING ANY TOOL TO UNSCREW THE WASHER FROM THE

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(continued from previous page) rod. The metal used is by no means tough stuff and can be damaged easily. BAR Feeding Problems I have a customer who is having feeding problems in his .308 Browning Automatic Rifle. What is the most common cause of this problem? Thanks. Preston The most common cause is ammunition related, particularly if reloads are involved.

Other possible causes are rough or bent magazine lips, a weak or broken magazine spring, a sharp edge at the chamber rim, the bolt cover too tight or too loose, the gas regulator orifice too small, or the barrel gas orifice too large. The magazine follower could also be cocked or canted between the sides of the magazine when the shells are being chambered. Sauer Ejector Rod I am trying to locate ejector parts for a J. P. Sauer .22 Long Rifle western revolver. The ejector is missing on the one I have.

I have contacted the major supply houses without any luck. Would another manufacturer's ejector work? The gun is in very good shape, and I would very much like to shoot it. Thank you for your time. Robert J. Loughlin, Jr. Columbus, New Jersey According to *Pistols of the World*, your revolver was made in the mid 1940s and was more or less a clone of the Colt Single Action Army. Sauer is now a part of the Sigarms operation, but we are quite certain they have no parts for the gun.

If the revolver is a faithful copy of the Single Action Army as reported, it employs an ejector rod to push spent cases from the cylinder rather than a star extractor like the S&W, Taurus, Colt, Ruger, and other double-action revolvers. Therefore, another manufacturer's copy of the Single Action Army in caliber .22 might have an ejector rod that will fit or can be modified to fit your revolver. Barrel Latch Fix I'm working on a Savage 311.

The barrel-latch lever returns beyond center when closing the barrels to breechface (see photo attached). Please give me your best suggestions for a fix. This is a purely cosmetic challenge, as all else is in good shape. This piece does suffer from a slight "low-hammer problem" that was covered very nicely by Sergey Lyalko in his article on the subject in the March 2001 issue of *American Gunsmith*.

The firing-pin indent is quite ample and the barrels only rise slightly, barely enough to prevent hulls from dropping out if the piece is inverted. We don't feel a repair here is warranted. Thanks in advance for your help. G. E. Butler Disassemble the gun per instructions in *Gun Digest's* book of disassembly/ reassembly for shotguns, second edition.

Replace the barrel-latch detent plus its spring or modify the latch's interface surface with the barrel latch so the latter returns to the more cosmetically acceptable center position. Remington 7400 in .270 I

have a Remington 7400 in .270, and shoot 130-grain bullets. I have had a recent problem with it. The first bullet chambers fine, but the second one jams. I found that the operating-handle pin was catching on the magazine. I filed the pin down so that it would not catch or slow the action down.

However, it is still jamming. What else could be causing it to jam? I have also tried filing down the tabs on the magazine, thinking that this could cause the rifle's action to slow down. Kevin McIntyre Wheaton, Illinois The front magazine lips may be bent outward too much, the rear lips bent downward too much, or the magazine sides bent inward too much. The magazine itself could be riding too low in the receiver. If so, replace the mag latch with a higher numbered size.

If the jamming is caused by the action not blowing back enough, there's probably a problem with the gas system. The gas-orifice diameter for the .270-caliber is supposed to be .073. Check it and, while you're at it, make sure it's not fouled. Inspect the gas-nozzle hole in the action sleeve to see if there's a breakthrough into the spring hole in the receiver. And make sure the gas-orifice ball and screw are present. These parts often become lost during unauthorized or inept disassembly.

Finally, check the chamber, polish it lightly, and double check the ammunition. If the load is too light, the gun won't function.

SEARCHABLE ISSUE RECORD

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