



OCT 2004

DIGITAL ARCHIVE
EDITION

PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

A TECHNICAL JOURNAL OF CRAFT, REPAIR & RESTORATION

10

ARCHIVE ISSUE NUMBER

INSIDE THE ARCHIVE

WORKING THE REMINGTON MODEL 12

JURY CLEARS BERETTA IN ACCIDENTAL SHOOTING • EXPLORING THE NEW TAURUS PT24/7 • MAKING AN ACTION WREN...

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 011

DIGITAL ARCHIVE EDITION

Preserved for the bench.

This edition presents the original American Gunsmith editorial work in a modern, searchable layout while preserving its issue, author, and source-page history.

ABOUT THIS EDITION

The article text comes from the original issue and has been reflowed for legibility. Obsolete subscription, ordering, association-service, and house-advertising pages are not reproduced.

Original article images appear only where permission has been confirmed. All other image positions remain visibly reserved so approved art can be restored without rebuilding the issue.

Report corrections or rights information to editor@gunsmithmag.com.



AMERICAN GUNSMITH

DIGITAL ARCHIVE EDITION • OCTOBER 2004

ISSUE RECORD

ORIGINAL DATE	October 2004
VOLUME	Archive volume not stated
ISSUE NUMBER	10
SOURCE ID	ag-0787ee8cf1aaa2621c0de7b0

DIGITAL EDITION

PUBLICATION	American Gunsmith
EDITION	Digital Archive Edition
ARCHIVE STEWARD	Innovation Network LLC
CONTACT	editor@gunsmithmag.com

Editorial fidelity. Article titles, author attribution, issue relationships, source-page references, and article text remain bound to the archive corpus. Layout, covers, navigation, and conversion notes are newly produced for this edition. Historical statements remain part of the original editorial record.

IN THIS ISSUE

Contents

A complete guide to the searchable editorial work preserved from October 2004.

2 Jury Clears Beretta in Accidental Shooting

AMERICAN GUNSMITH EDITORS • ORIGINAL PAGES 2

3 Exploring the New Taurus PT24/7

CHICK BLOOD • ORIGINAL PAGES 3-6

7 Making an Action Wrench For the Weatherby Mark V

NORMAN E. JOHNSON • ORIGINAL PAGES 7-9

10 Simple Pump-Shotgun Fixes: An Armorer's View

ROBERT K. CAMPBELL • ORIGINAL PAGES 10-13

14 Tech Topics

AMERICAN GUNSMITH EDITORS • ORIGINAL PAGES 14-15

16 Working the Remington Model 12

DENNIS A. WOOD • ORIGINAL PAGES 16-21

22 Reader Forum

AMERICAN GUNSMITH EDITORS • ORIGINAL PAGES 22-24

PEOPLE & COMPANIES

Jury Clears Beretta in Accidental Shooting

BY AMERICAN GUNSMITH EDITORS OCTOBER 2004

ORIGINAL PP. 2

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A983-P02-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A983-P02-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A983-P02-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A983-P02-F02

Handgun Control, Inc., has struck out in a third retrial of a case that has garnered national attention. Shortly before we went to press, the NSSF's online news service reported that an Alameda County (California) Superior Court jury found that Beretta U. S. A. Corp. was not responsible for a 1994 accidental shooting death of a 14-year-old boy. Kenzo Dix was killed when his friend played with a firearm that was left loaded and unlocked by an irresponsible parent.

The jury deliberated only five hours before returning a verdict in favor of Beretta U. S. A. Corp., finding the pistol's design did not cause the accident. This was the third time the case had been tried. The lawsuit was filed in 1995 on behalf of the victim's parents by lawyers from Handgun Control Inc. (since renamed the Brady Center to Prevent Gun Violence).

Handgun Control Inc. tried to claim Beretta was at fault for not having included a built-in lock and for not providing more warn-

ings by having a different "loaded chamber indicator" feature than the one on the firearm. The case gained national media attention in late 1998 when a jury in the first trial found that the design of the Beretta pistol was not defective and did not cause the accident.

An appellate court, however, ordered a retrial because a juror allegedly told fellow jurors he didn't think Beretta was at fault before the jury began its deliberations. In a retrial last year, the plaintiffs were again unable to convince a jury that the pistol's design was defective and caused the accident resulting in a mistrial.

The Dix case was the first major lawsuit filed and funded by the Brady Center against a firearms manufacturer in an attempt to use litigation to force the redesign of firearms to include so-called "safety" devices. The Brady Center has filed similar suits against other manufacturers. "The Brady Center has struck out. This jury, as two others before it, listened carefully to all

the evidence and again refused to blame the product manufacturer for reckless misuse of its product," said Lawrence G.

Keane, senior vice president and general counsel of the National Shooting Sports Foundation, the firearm industry's trade association. "Unquestionably, the Brady Center has suffered a major setback in its efforts to use the courts to force its gun-control agenda upon product manufacturers and their design engineers who care deeply about the safety of consumers and who design safe and reliable products," Keane added.

He noted that the number and rate of firearm accidents are at their lowest levels since record keeping began in 1903. And, of course, since 1903 the number of firearms in private ownership has grown significantly. Editor Keith Lawrence Technical

PEOPLE & COMPANIES

Exploring the New Taurus PT24/7

Taurus has never made a pistol like this one, and the company predicts it will be the next gun to be copied by everyone else.

BY CHICK BLOOD OCTOBER 2004

ORIGINAL PP. 3-6

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A984-P03-F01. Know the rights holder? Please ask them to contact us.
AG-621C0DE7B0-A984-P03-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A984-P03-F02. Know the rights holder? Please ask them to contact us.
AG-621C0DE7B0-A984-P03-F02

Considering the plethora of Browning-design clones, the forecast that this gun will be widely copied is not a modest one. Nor is the claim without merit. Taurus researched and engineered the 24/7 nearly five years before settling on a combination of features and enhancements never previously offered in their defensive handguns. Eliminated is a bushing. Instead, the barrel is flared slightly at the muzzle for improved reliability and accuracy.

The ejector has been tuned and the ejection port lowered as it would be in a match-prepared M1911. Spent brass is kicked out more sideways than upward and always clears the slide. A red tab sticks out prominently when alive round is in the chamber. A one-piece guide rod and computer-designed spring assembly make for easy basic take-down and reassembly, while helping to keep the slide moving smoothly. The trigger pull is silky for a double-action-only pistol, with minimal takeup and a clean break.

Ergonomically, the attention to detail with the 24/7 is outstanding. There are memory pads, or indentations, in the frame so fingers are positioned automatically for a repeatable grip, and the oversize molded-rubber Eliminated or altered are components that would tend to detract from reliability and accuracy. Grip itself is married permanently to the polymer frame. This is a Taurus exclusive, by the way.

Front and rear sights are user interchangeable, with no gunsmithing required. (Boo!) Unlike the Taurus PT111 (see the January 2001 issue), the PT24/7 can be completely taken down and serviced by a practicing gunsmith. (Hooray!) Field Stripping You're wearing eye protection, the magazine is out, and the chamber is empty. The 24/7 is the newest in the Millennium Pro line. Some models of these pistols may have a disassembly pin instead of a disassembly latch.

In such cases, basic takedown instructions differ only slightly. Pull the slide to the rear, locking it open by moving the slide-stop lever (#4.12) upward. Rotate the disassembly latch (#4.3) toward the muzzle until it stops. (On models with the disassembly pin, use the Taurus security-system key to start the disassembly pin out from the right side of the frame.) Depress the slide stop. Ease the slide forward a little. Nudging the latch (or pin) out further at this time sets it up for easy removal.

Retract the slide again and engage the slide stop. Pull the trigger hard. Control the slide, depress the slide stop, release the trigger, and move the slide forward off the frame. If the slide sticks, pull hard on the trigger as you pull on the slide. Another cause for sticking occurs when the barrel is tilted upward and remains positioned to the rear. If that happens, push the muzzle against the palm of one hand while pushing the slide forward simultaneously with the other hand. Invert

EXPLORING THE NEW TAURUS PT24/7 CONTINUED

ORIGINAL PAGE 4

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A984-P04-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A984-P04-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A984-P04-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A984-P04-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A984-P04-F03. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A984-P04-F03

the slide. Compress the recoil-spring assembly, and lift it free followed by the barrel. If desired at this time, both front and rear sights (#1.3 and #1.4) can be removed with a properly fitting screwdriver. A jeweler's type would be about right, but it may not be husky enough to turn the screws. In that case, you'll have to grind down a thicker blade with a sturdier shaft. Detailed Disassembly of the Slide Without applying excessive pressure, secure the slide upside down between protective vise jaws.

Use a 3/32-inch punch to drive the extractor pin (#1.7) out through the top of the slide. Watch your step; when the pin is gone, the extractor (#1.5), extractor spring (#1.6), firing-pin block (#1.16), and spring (#1.17) will be freed up. But attached to the extractor are the loaded chamber indicator (#1.8), its spring (#1.9), and a really small detent ball—all of which can depart the bench area when the slide is removed from the vise. Insert a small screwdriver under the slide cap (#1.15). Raise it up toward you.

The 3/32-inch punch is used Like all pins in the PT24/7, they are tight. again to reach in through the firing-pin retainer (#1.14) to compress the guide (#1.10). Withdraw the

punch sufficiently to allow you to lift the retainer upward, and place a finger over the rear of the slide as you clear the retainer from the firing-pin tunnel opening in the slide. Control the assembly (#1.13); it will be pushed out to the rear by its spring and could easily find a dark corner to hide in if you don't.

What remains in the slide is the guts of the security system, and that is left alone. Detailed Disassembly of the Frame Before you begin, the manual safety (#4.23) must be "on." This will prevent loss of the safety-spring ball (#4.25). That loss having been avoided, drift out both grip pins (#5.2), and separate the frame from the integral molded grip. Like most pins and screws in the 24/7, these are tight installations. Start them with a short punch and support the frame between two blocks of wood.

If you lack a parallel punch, meaning untapered, to drive the pins all the way out, cut off apiece of drill rod the same diameter as your starter punch but long enough to get the job done. Now snap the safety down and remove it from the frame. Lift the ball from the top of the spring (#4.24) and fish out the spring. Carefully lift free the slide-catch

spring (#4.13) and the slide catch (#4.12). The trigger pin (#4.17) has ahead on its left end. Use the 3/32-inch punch to push it out from the opposite end.

Slightly pull the trigger (#4.14), press down on the trigger bar (#4.10), and then wiggle it fore and aft until the bar and trigger separate. Set the trigger assembly aside. Push out the frame bushings (#4.2) with an appropriate diameter punch. Remove the central support (#4.26). There are four small pins remaining to be dealt with. Two of them (#4.5 and #4.6) are trigger-bar ramp pins. One of those (#4.6) is a roll pin. The other two (#4.8 and #4.9) are ejector pins, and one of those (#4.9) is a roll pin.

All four of these small pins are fit very, very tightly in the frame. They are difficult to remove and my recommendation is to have extras on hand in case of damage. You'll need a 1/16-inch-diameter starter punch, a longer 1/16-inch-diameter punch, and a 1/16-inch-diameter roll punch. Get the pins moving inward with the starter punch and, depending on the type of pin, finish up with the longer punches. As I have often suggested in past articles, do

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A984-P05-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A984-P05-F01

Assembly Taurus Model PT24/7 Semi-Automatic Pistol
1.2 Rear/Front Sight Screw 1.3 Front Sight Assembly
(Specification subject to change without notice) 1.4 Rear Sight Assembly
1.5 Extractor 1.6 Extractor Spring 1.7 Extractor Pin 1.8 Loaded Chamber Indicator
1.9 Loaded Chamber Ind.

Spring 1.10 Firing Pin Guide 1.11 Firing Pin Return
Spring 1.12 Firing Pin 1.13 Firing Pin Spring Assembly
1.14 Firing Pin Retainer 1.15 Slide Cap 1.16 Firing Pin
Lock 1.17 Firing Pin Lock Spring 1.18 Key Lock 1.19
Key Lock Spring 1.20 Key Lock Ball 1.21 Key Lock Pin 1
Slide 1.1 Slide 2 Barrel 3 Captive Recoil Spring
Assembly 4 Frame Assembly 4.1 Frame 4.2 Frame
Bushing 4.3 Disassembly Latch 4.4 Trigger Bar Ramp
4.5 Trigger Bar Ramp/Ejector Pin 4.6 Trigger Bar Ramp/
Ejector Pin-Elastic 4.7 Ejector 4.8 Ejector Pin 4.9
Ejector Pin-Elastic 4.10 Trigger Bar Assembly 4.11
Trigger Bar Pin 4.12 Slide Catch 4.13 Slide Catch Spring
4.14 Trigger 4.15 Trigger Safety 4.16 Trigger Spring 4.17
Trigger Pin 4.18 Trigger Support 5.1 Grip 4.19 Trigger
Lock Pin 5.2 Grip Pin 4.20 Trigger Support Spring 5.3

Magazine Release 4.21 Slide Retainer 5.4 Magazine
Release Spring 4.22 Slide Retainer Spring 6 Magazine
Assembly 4.23 Manual Safety (optional) 6.1 Magazine
Body 4.24 Manual Safety Spring (opt.) 6.2 Follower
4.25 Man.

Safety Spg. Ball (opt.) 6.3 Magazine Spring 4.26 Central
Support 6.4 Magazine Spring Plate 5 Grip Assembly 6.5
Magazine Bottom not totally remove the roll pins; allow
them to partially remain in the frame but clear of the
part to which they relate. In this manner, you will still
be able to take out the ejector (#4.7), slide retainer
(#4.21), its spring (#4.22), the trigger-bar ramp (#4.4),
and you'll create fewer problems for yourself when rein-
stalling the roll pins.

Detailed Disassembly of the Trigger Assembly If it isn't
necessary to replace a damaged part, don't disassemble
the trigger assembly. Reassembly is very complicated.
I'll get into the associated headaches of that process lat-
er on. The trigger-lock pin (#4.19) has ahead on one
end. You'll need a

EXPLORING THE NEW TAURUS PT24/7 CONTINUED

ORIGINAL PAGE 6

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A984-P06-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A984-P06-F01

" The Taurus security-system pin is located at "B" and should not be removed from the slide. fresh one to put the assembly back together. After you start the pin out from the end opposite the head, you're going to chop off the head with a cutting wheel chucked into a Dremel tool. That done, and with the remainder of the pin removed, the trigger (#4.14) and its support (#4.18) can be parted. There's another tiny spring (#4.20) located between the support and trigger.

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A984-P06-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A984-P06-F02

Remember that spring; it will have to be held in position by a dab of grease placed in the spring's trigger-support hole during reassembly. Also remember that the trigger safety (#4.15) wears a hook that sits atop the trigger bar. Reassembly will require the use of protected vise jaws and parallel smooth-jaw pliers (from Brownells). You have to put pressure on the spring, align the trigger bar and the support, and keep everything aligned with a punch when reinstalling the assembly pins from the opposite side

PEOPLE & COMPANIES

Making an Action Wrench For the Weatherby Mark V

This special action wrench provides a practical means of switching barrels on the Weatherby Mark V single-shot action for standard rifle cartridges.

BY NORMAN E. JOHNSON OCTOBER 2004

ORIGINAL PP. 7-9

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A985-P07-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A985-P07-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A985-P07-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A985-P07-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A985-P07-F03. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A985-P07-F03

Over a period of years, I've converted a number of rifles to switch-barrel use. These have included the Winchester Model 70, Remington 700-Series, Remington XP-100, and Remington Model 40X bolt-actions, as well as some breakopen-type actions. Each bolt-action type required a different style action wrench to properly fit the receiver. And, with each action type, I wanted to be able to remove the barrel and install different ones without disturbing the action in the stock or removing the scope from the receiver.

Thus, a special action wrench and torque bar were required to make this possible. Making an action wrench to fit the normal bolt-action locking-lug raceways presents no special

problems. The laterally opposing lugs on these wrenches slide inside the milled action raceways like a rifle bolt, and engage in the forward area of the receiver where torque is applied to the wrench. The action wrench used on the Weatherby Mark V, however, is quite different by design.

Here, the extreme diameter of the radially positioned bolt-locking lugs is the same as the bolt, which is 0.700 inch for the standard-cartridge receiver. Though unique in construction, making such a wrench to fit the Weatherby action is not complicated. Nevertheless, detailed directions will make the job much easier than using the trial-and-error method. The principle involved here

finds the three locking lugs on the action wrench engaging the sides of the three pairs of locking lugs inside the Mark V action.

The three wrench lugs engage the six receiver locking lugs from the sides (radially), whereas the rifle-bolt lugs engage the receiver lugs in a conventional way (axially). The wrench for the Weatherby Mark Vis third from the top. With the barrel removed from the Weatherby action, a close look from the threaded end shows the three pairs of triangularly positioned locking lugs. You will note these pairs of lugs are not equally positioned.

The top pair is positioned at 12 o'clock, the lower-right one is at about 4:20, and the left lower one is

MAKING AN ACTION WRENCH FOR THE WEATHERBY MARK V CONTINUED

ORIGINAL PAGE 8

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A985-P08-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A985-P08-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A985-P08-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A985-P08-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A985-P08-F03. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A985-P08-F03

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A985-P08-F04. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A985-P08-F04

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A985-P08-F05. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A985-P08-F05

Above center: The lugs are formed at the end of the Weatherby action wrench with a 3/8-inch ball-end mill. at approximately 8 o'clock. Don't let this discourage you, because marking and cutting the raceways in the head of the action wrench to match the receiver-locking lugs is very easy. First, I had already turned the main action wrench to a diameter of 0.700 inch and a length of 8.5 inches, and formed the end for a 1/2-inch socket-wrench drive.

Then, with the shaft inserted into the receiver bolt hole, you can look right into the receiver and see the end of the shaft resting against the recoil lugs. From this position I immobilized the shaft by turning an action screw against it. I then carefully marked

around the borders of the receiver-locking lugs on the butt surface of the action wrench. Either a very fine felt-tipped pen or a sharp metal scribe will work well for this.

The shaft is then placed horizontally in the mill vice and a 3/8-inch In the center is the action wrench along with the socket-wrench coupler. At the top is the torque bar with a 1/2-inch socket-wrench drive. ball-end mill is used to form the end grooves in the action wrench that engage the receiver-locking lugs. Actually, the sides of the receiver-locking lugs are at nearly a 45-degree angle, and these form an almost perfect fit to the radius groove cut by the 3/8inch ball-end mill.

Then, as the first top-end groove is cut to a length of about 5/8 inch and a depth of 0.130, the shaft should again be inserted into position to check for precise alignment of the groove with the locking lugs. This is a good time to check if your marks are correctly positioned for the next mill groove. This procedure is followed until all three grooves are cut. At this time, try the wrench for fit into the receiver-locking lugs.

Here is where you will see the receiver-locking lug lateral surfaces are at a 45-degree angle, which fit nicely into the rounded, milled grooves in the head of the action wrench. Careful inspection will indicate where, if any, additional spot milling may be required to ensure uniform contact

MAKING AN ACTION WRENCH FOR THE WEATHERBY MARK V CONTINUED

ORIGINAL PAGE 9

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A985-P09-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A985-P09-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A985-P09-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A985-P09-F02

The torque bar is coupled to the action wrench with a 1/2-inch socket wrench. at all surfaces within the grooves. Though this procedure may appear complicated, it is not. Each rounded mill cut should be close to a depth of 0.130 inch. There is a good chance the head of the action wrench will fit quite well as you first try it. If not, you will be able to clearly see where a shave of metal must be removed with the end mill for a proper fit.

Where there is a snug fit, the use of a small brass hammer to tap the end of the action wrench against the lugs will show where additional milling is required. I achieved a nearly perfect fit on the second try in this way. Coupling of the action wrench with the main torque handle is accom These barrels are fitted and headspaced to the Weatherby action.

From the left is the Broughton barrel in .257 Ackley Improved, the Weatherby/Krieger barrel in .243 Winchester, and the Weatherby/Krieger barrel in .22-250 Remington. plished via a standard 1/2-inch-drive socket wrench. This end of the wrench can be made to 1/2-inch square drive or a hexagon to fit a six-point socket.

I've made these wrenches for others and have used both the 1/2-inch square end as well as an 11/16- and 3/4-inch hexagon drive.

Where a 3/4-inch hex drive is used, I simply turned an 8-1/2-inch piece of hexagon shaft to the required 0.700 diameter and left a 1-inch hexagon end on it. Of course, you'll need a suitable barrel vise as you switch barrels and the torque bar. The padded barrel vise was covered in the March 2003 issue of American Gunsmith, and this vise works very well. As a torque bar, all you'll need is a 1/2-inch-square stud 1 inch long, welded at the center to a 2-foot length of 3/4-inch bar stock.

I've experimented with various amounts of applied barrel torque in arriving at a workable axial preload (torque pressure at the barrel receiver joint). I've found this can vary all the way from 75 foot-pounds to well over 140 foot-pounds with little, if any, noticeable changes in point of bullet impact and accuracy, or cartridge headspace. You must strive for uniformity, however, as torque is applied. It's much like tightening the lug nuts on your automobile rims—common sense and "feel" go along way.

I've monitored barrel torque with a special torque wrench and discovered a fair amount of leeway is permissible. While at the Weatherby plant at Brainerd, Minnesota, I learned that 120 to 140 foot-pounds of torque is applied to the barrels on Mark Vactions used for standard rifle cartridges. I use some thread lubricant when switching barrels, and the type is not critical. A light coating of heavy oil or white-lube on the barrel shoulder and the threads works out well.

I've never had a barrel loosen while shooting, or change torque, even after extended use. Under closely controlled conditions, I've removed a barrel and replaced it while shooting a five-shot group, and the group remained under one minute of angle. Conclusions If the only thing standing in your way to converting the Weatherby Mark Vaction to switch-barrel use is an action wrench, this is a small hurdle to overcome. Anyone with average shop experience can make his own, and the cost is very low. ■

FINISHING

Simple Pump-Shotgun Fixes: An Armorer's View

Policemen are hard on their shotguns, but some sporting arms see service nearly as rough. These simple tips can keep a good shotgun pumping.

BY ROBERT K. CAMPBELL OCTOBER 2004

ORIGINAL PP. 10-13

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A986-P10-F01. Know the rights holder? Please ask them to contact us.
AG-621C0DE7B0-A986-P10-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A986-P10-F02. Know the rights holder? Please ask them to contact us.
AG-621C0DE7B0-A986-P10-F02

Not long ago, when I showed a friend my Remington 870 shotgun, I was a little embarrassed. This gun has been beat up and abused for more years than I care to remember. The finish had seldom been wiped with oil and the nicks and dents were not from honorable hunts but from being thrown into the back of a vehicle and haphazardly stored in various corners of the home. I clean and lubricate my handguns to a much higher standard.

I suppose that my 23 years as a peace officer had convinced me that the pump action in general and the Remington in particular could take this kind of abuse. Often this is true but not always. Over time, I've run into practically every type of malfunction possible with the pump or "slide-action" shotgun, and most were easily repaired. Let's look over just a few and their likely cures.

As for agency-issued guns, the most common culprit in malfunctions is accumulated dirt, grit, and gun oil that's turned into varnish. These guns just don't get the mainte-

nance demanded by semi-autos. I've seen guns fail to feed properly on several occasions, but sometimes this is caused by short-shucking or not working the slide properly. Other problems I have encountered required more attention.

I've broken one shotgun, for example, by quickly working and slamming the action. (It wasn't a Remington.) I repaired and sold the shotgun, considering it a second-rate choice. Most of my experience revolves around the Remington, but in general the same rules apply to all pump-actions. First, let's consider how the gun operates. The pump shotgun has a forend that actuates the loading mechanism.

When the gun is fired or in the unlocked position, the forend is pulled to the rear and one or two draw bars or action rails move the bolt to the rear. The magazine releases a shell into the carrier, and as the slide is pulled forward, the shell is brought into the chamber by a carrier and the bolt is brought forward to chamber the shell. At the end of the slide's travel, the gun is in

the locked position. The forend cannot be brought to the rear unless the bolt is released. Firing the gun releases the bolt.

When the gun is fired, the bolt unlocks and the slide action can be worked again. A button is placed on the side of the triggerguard in most variations of the pump that allows the bolt to be manually unlocked and a chambered shell unloaded. The only safe mode of storage of any long arm in police service is with the chamber empty. A quick shuck of the pump is all that is needed to place it on the ready.

The first thing I do when checking complaints against the firearm—after making certain it is unloaded—is to attempt to work the action and dry fire the gun. Snap caps or dummy rounds can be used; but keep in mind, dummies don't always weigh the same as live rounds or have the same dimensions. A carrier that will lift a dummy may not always work. The magazine tube must be replaced.

SIMPLE PUMP-SHOTGUN FIXES: AN ARMORER'S VIEW CONTINUED

ORIGINAL PAGE 11

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A986-P11-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A986-P11-F01

Original caption: Right top: These action bars are nice and straight, and the author has polished the channels they ride in for maximum smoothness. Right bottom: This is a relatively new 870 Magnum action, but the gun has seen some hard knocks as evidenced by the numerous dings in the gun's finish with live rounds. That is something I've run across several times.

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A986-P11-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A986-P11-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A986-P11-F03. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A986-P11-F03

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A986-P11-F04. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A986-P11-F04

To check a slide-action shotgun, work the slide to the rear and allow the bolt to move fully to its rearward position, then pull the slide back to the front and allow the bolt to lock. The gun should remain locked against forend pressure. Next, be certain the slide lock releases as designed. The Remington uses a small lever beside the triggerguard as a release. The release should release the bolt, allowing the bolt to move to the rear.

With a triple-checked, unloaded firearm, pull the trigger and be certain the hammer falls. Remember the hammer may fall but not fall hard enough to set off alive round. (Livefire checks come later.) Next, run dummy rounds through the magazine and be certain the shotgun properly feeds each shell. Dummy rounds can be made with fired cases—without the use of a shell reloader—by carefully

folding the end of the shell back into a semblance of a crimp. A final check is always important.

Not long ago, I had a shotgun come my way with a missing safety. This pump-action Stevens featured a safety mounted in the triggerguard, but when using it, the safety had simply gone south and was never found. The owner told me it had not worked for awhile, but he was surprised when it fell out. His solution was simple: "I loaded the gun just before I went hunting." Wow! I'm glad I was not his hunting buddy. The final check of the pump shotgun is to cock the gun and place the safety in the "on" position.

Pull the trigger. The gun should not fire. And the gun should not fire when the safety is released. It's often recommended to place the

gun in a firing mode and bump the buttstock on a hard surface to be certain it doesn't fire or release the hammer. Do this with the safety off, and also with the safety on as a check. Occasionally, hard wear will allow such a gun to fire. I've had this happen on one occasion. Hard wear includes a cop using the shotgun's buttstock to beat in a door.

Thank goodness they don't do this with a loaded chamber—at least I hope they don't. Even an 870 will only take so much.... When you find a problem, there is usually a fairly simple cure. Cleaning and lubrication will often do the trick. In some cases, it will be the first maintenance a police shotgun has ever (continued on page 21)

enjoyed. When the action arms stick, the gun cannot be operated. If you take a close look at the recesses the action bars ride in, they are fairly tightly fitted. A small item such as a splinter from the wooden forearm can invade these recesses and cause a tie-up. There can also be raised burrs in the rails that cause difficulty. The first thing to do is to clean the rails and slide bars up, and perhaps polish each. This makes for a slicker action and will allow the gun to cycle with less trouble.

Next, a bent magazine tube can cause problems. There are a great number of extended magazine tubes on the market, some of metal and some of plastic. I've examined several police shotguns featuring magazine extensions that extended 1/4 inch past the muzzle. Many of these are of varying quality and are easily dented or cracked. Factory extension tubes are far more rugged. I would not recommend the plastic ones at all. The Remington factory standard-length tube offers four shots for sure, and is highly recommended.

Installing these tubes is simple, and you can draw your own conclusions as to the quality of the gear. Again, factory units are the most rugged in my experience. Dented tubes were once common, and gunsmiths used a dowel of some type to ram into the tube and straighten it for further use. For some reason, I haven't seen a bent tube in some time, but I am certain it still happens. The cure is quite simple.

Remove the magazine tube from the gun, take a wooden dowel of appropriate diameter, and ram it into the magazine, springing the magazine back into shape. If the dent is severe enough, then the tube should be replaced. A final option that many law-enforcement officers find helpful is the installation of the large safety button from Wilson Combat. To do this, drive the safety out left to right (looking at the bottom of the gun) and replace it.

The detent ball for the safety is very small and rides in the triggerguard flange. Don't lose it. It may take a few tries to get this correct, but many shooters report much better handling with this safety. That's about all the 870 and similar pump-actions need, and the Wilson Combat safety is more of a bonus than a real requirement.■

TOOLS & FIXTURES

Tech Topics

In this column, we examine new tools and tooling, tips and techniques, and news items of interest to the gunsmithing community. Kuhnhausen Does it Again

BY AMERICAN GUNSMITH EDITORS OCTOBER 2004

ORIGINAL PP. 14-15

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A987-P14-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A987-P14-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A987-P14-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A987-P14-F02

In this column, we examine new tools and tooling, tips and techniques, and news items of interest to the gunsmithing community. Tech Topics Kuhnhausen Does it Again We're often asked how someone interested in gunsmithing can become atop-notch professional. The answer in simple words is: careful study along with hands-on experience—and plenty of both. But there are many obstacles to be overcome.

Nobody has one of every type of firearm to lay their hands on. (Some museums might, but you can't touch or borrow their exhibits.) For liability reasons, owner's manuals don't go beyond field stripping in most cases. No single book goes beyond all owner's manuals. Few interested parties know an expert gunsmith both willing and able to take on an apprentice for five or six years.

Also, few people can afford to attend a resident gunsmithing school, and correspondence schools don't always address the most current and popular firearms. Admittedly, the best way to reach the top of the profession is to combine attendance at a resident school with some sort of apprenticeship. But unless the school happens to be in your home state, the cost of attending

is usually prohibitive, and, as mentioned, finding an expert practitioner of gunsmithing in a position to "adopt" you is a slim prospect.

Are there alternatives? Certainly. Only slightly less productive from an instructional standpoint would be to find your way into a number of NRA gunsmithing schools, while amassing and studying a library of books on gunsmithing. We speak not of one or two volumes, but enough to fill a substantial library, with room for more to come. The pages you collect do not all have to be hard bound.

Soft-cover military technical manuals remain efficient references and are still available for martial arms dating back to the Civil War. (By the way, any investment made in your library for business purposes is tax deductible.) Still another method of gaining hands-on experience and expert instruction depends on your relationship with your local chief of police or sheriff.

Perhaps he would write a "to whom it may concern" type of letter, naming you as his departmental armorer consultant and requesting the recipient's cooperation in furthering your abilities to evaluate law-en-

forcement firearms. A copy of that letter sent to major manufacturers would allow you to attend their armorer's schools. The list would include S&W, Remington, Ruger, H&K, Glock, Sig Arms, and Beretta among others. Some of these schools charge "tuition" for attending (also tax deductible for business purposes).

Others don't. In every case, you would be responsible for your transportation, shelter, and sustenance. (More tax deductions.) They are all, however, very complete, quite intensive, and you will depart proficient at servicing the particular firearm or firearms with which you have worked.

It was at an armorer's course (a S&W revolver update session) we attended several years ago that we first heard the name "Kuhnhausen." The exact words uttered by the chief instructor were: "If you forget any part of what we've tried to teach you here, read Jerry Kuhnhausen's book." He wasn't kidding around, either. Jerry's Shop Manual on Smith & Wesson's K, Land N Frame Revolvers contains everything—make that everything I & II, by Jerry Kuhnhausen would make a good addition to your bookshelf.

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A987-P15-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A987-P15-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A987-P15-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A987-P15-F02

and more—that we tried to soak up at that update session. It was added immediately to our bookshelves, and was subsequently joined by other Kuhn-hausen shop manuals as soon as they were published (Heritage-VSP Publications, Mc Call, ID 83638; available from Brownells).

These included his two-volume work on the M1911, his Gas Operated .30 Caliber US Service Rifles, The M1 Carbine, Remington Shotguns, two manuals on Colt Double Action Revolvers, Mauser M91 through M98 Bolt Action Rifles and another double volume on Colt Single Action Revolvers. Now, Kuhnhausen has done it again; this time with The Ruger Single Action Revolvers which also combines two volumes in one.

If you have any cowboy-action customers, just reading the cover alone of Jerry's latest will cause both you and your customers to drool: "Covers Old Model and New Model Ruger SA revolver mechanisms; OM transfer bar conversion actions; design history; safety system and action function; bench checks; assembly/disassembly; parts inspection; parts replacement and fitting; checking and adjusting pawl lift and cylinder carry up; action timing and trigger pull; complete repair and mechanical restoration, and accuracy improvement with detailed troubleshooting and custom work sections." That can be translated to: If

there's anything at all you want to know about the New Model Blackhawk, Single Six, Super Blackhawk, Vaquero, Bisley, Bearcat, the Old Army, and out-of-production models—it's in there.

Just to whet your appetite, you'll find mechanical rehabilitation of Old-and-New-Model revolvers, basic repair work and action tuning, cartridge and chamber data, disassembly/reassembly with pre-disassembly bench checks, tooling required to untorque frames/barrels and barrel removal, page after page of schematics, plus repeated reminders about safety. Section IV of the manual is a seven-page troubleshooting guide.

Section V (Pages 192-246) is dedicated to custom work including caliber conversions and remedies for uncommon frame-related problems. Though you'd be tempted to, and probably will do otherwise, we recommend the first page you read be number 56. It's a set of rules to work by that will keep you out of trouble and free of encounters with trial lawyers. We look upon Jerry Kuhnhausen's series of manuals with admiring eyes.

No, they won't totally resolve the "hands-on" advice given earlier here, but they'll let you stand beside a master gunsmith who doesn't mind sharing his knowledge so you will be able to safely and capably provide hands-on attention to the guns most likely

to pass through your shop door. New Offerings From Krause Publications Speaking of adding to your gunsmith reference library, a fine place to begin is with J. B. Woods' newest editions in Gun Digests' Assembly/Disassembly series.

Each book is dedicated to a single type of firearm and follows Woods' familiar picture/caption, step-by-step format. How many guns are covered? The revolver volume covers 60 popular wheelguns and 130 variants. In the rimfire rifles volume, there are 62 plinkers and 178 variants; in pistols there are 72 self-loaders plus 250 variants; in shotguns 59 plus 258 variants; and in centerfire rifles, 66 with literally hundreds of variants.

For those unfamiliar with the term, a variant is a gun that takes down and reassembles in the same or very similar manner as the featured firearm. We're not talking field stripping here, people. Total disassembly has been the target since the earliest days of the Gun Digest series, and that remains so along with helpful reassembly tips. Another entry from Krause is Robert W. D. Ball's updated Mauser Military Rifles of the World.

This hardcover reference catalogs Mausers from 56 countries; with historical notes explaining the models used by each country; where the model was made; as well as specifications (continued on page 21)

including overall length, weight, barrel length, caliber, rifling, and sights. Over 1,000 full-length photos are augmented by close-ups showing markings and stocks. A special chapter on “Mauser Curiosa” details rifles that can’t be assigned to a specific category or may have been experimental or trial firearms.

In our opinion, Ball’s book combined with Ludwig Olson’s Mauser Bolt Actions, (available from Brown-ells) would represent the ultimate one-two punch on the subject, and should stand side by side on your shelf. The final Krause entry recommended here is a “must have” for reloaders and collectors: Cartridges of the World. As it happens, the book will also prove invaluable to a gunsmith researching a caliber.

They’re all here—wildcats, current, obsolete, proprietary, military, experimental, domestic and foreign, blackpowder, and smokeless—all covered in 18 chapters with diagrams and data. The final chapter concentrates on cartridge identification by measurement, and the information therein is pure gold. Pressure factors, case type, bullet/neck/shoulder/base/rim diameters, rim thickness, case length, cartridge length, twist, and primer are specified.

All this is followed by a 17-page index with over 50 cartridges per page. In scanning the pages and pausing to read several in detail, we got the distinct impression that if a cartridge isn’t in the book it’s never been chambered in a gun. For more information, call Krause Publications at or visit on the web. Have your membership number handy in order to receive your AGA member’s discount. ■

The membership rates stated above apply to gifts. Name Street City State Zip

PEOPLE & COMPANIES

Working the Remington Model 12

One company gets credit for making more slide-action rifles than all others combined. That's Remington, and the Model 12 is the manufacturer's first venture into the rimfire pump-action field.

BY DENNIS A. WOOD OCTOBER 2004

ORIGINAL PP. 16-21

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P16-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P16-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P16-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P16-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P16-F03. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P16-F03

We've all probably spent some time in the shooting gallery at a county or state fair trying to win a prize with our shooting prowess. Most often, the rifles were pump action, fired .22 shorts, and had sights that were never lined up with bullet impact. One of the more common rifles found at these fairs was the Gallery model of the Remington Model 12, and many of these guns are still in service. This model is another design from Remington's premier designer, John Pedersen.

The two most common styles you'll likely see are the round-barrel model with the flat buttplate and the octagonal-barrel model with the crescent buttplate. There are several stock configurations as well. Some have a slight pistol grip, and others will be seen with the straight or English-style grip. This article will help you to ensure that everything

is safe and functional, and if not, what's involved in restoring the rifle to a workable condition.

The takedown procedures detailed here will work for all Model 12s produced by Remington, including the Model 121. Removing the Wood There is a through-bolt holding the stock to the receiver, which is accessible once the buttplate has been removed with a #240-4 Magna-tip bit. The stock then slides off the receiver and is set aside.

In the event the stock bolt is missing and you need to make a replacement, the measurements are: 1/4-20 thread, 1/2-inch long; overall length is 3-3/4 inches; and the bolt-head diameter is .470 inch and is .160 inch thick. The screwdriver-slot width is .060 inch. The forearm has two retaining screws and one lock screw for each retaining screw. The retaining-screw lock screws are removed with a #120-3 bit, and the retaining screws with a #240-4 bit.

Later Model 12s have only a single retaining screw on each side of the forearm. The forearm will need to stay in place for the time being. Receiver Takedown As always, make sure that the chamber and magazine tube are empty. Secure the barrel in your padded-jaw vise with the bottom of the action facing up. On the right side of the receiver, just behind the ejection port, is the takedown screw. Make sure that the action is cocked so the hammer is back.

This screw has straight knurling on the periphery of the head for turning, and also a slot that a nickel fits in should the screw become stubborn on removal. Once this screw has been removed from the action, the trigger group will now slide backward and away from the action. If the trigger group is reluctant to depart the receiver, a few gentle whacks with a plastic-faced mallet on the front of the triggerguard will convince it to move rearward. Set the trigger group

WORKING THE REMINGTON MODEL 12 CONTINUED

ORIGINAL PAGE 17

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P17-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P17-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P17-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P17-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P17-F03. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P17-F03

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P17-F04. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P17-F04

aside for later attention. Slide the forearm back until the breech-block assembly is protruding about 1/4 inch out the rear of the receiver. Tilt the rear end of the breechblock assembly upward, and hold it in place while the forearm is pushed forward. This action will disengage the breech-block assembly from the action bar. Set this assembly aside. The action bar along with the outer magazine tube will now slide out of the forearm and out the rear of the action.

As the action bar is removed, be aware that the retainer (#257) may also come out of the receiver. The retainer hooks into a rectangular recess in the barrel just below the chamber mouth; it plays a very important role in the function of this rifle. The rear end of the retainer is also the ramp that feeds the cartridge into the chamber mouth, so don't

lose it. This part is also used on the Remington Model 121, and will definitely need to be scrubbed with a solvent to remove gunk buildup in the milled cutout areas.

The ramp portion needs to be looked over closely for any sharp edges that will peel the hide off a soft-nosed .22 rimfire round as it feeds into the chamber. Polishing this area judiciously will prevent the abrading of bullets and lessen the accumulation of crud in this area. All the internal parts have now been removed from the action. If restoration is part of the plan, the front and rear sights will need to be drifted out of the dovetails they reside in, along with the outer magazine-tube hangers.

I use copper drifts to remove Consider polishing the feed ramp. parts such as these to prevent any deformation of the part, and a

copper smear is easier to remove than the smear left by a brass drift. Keep in mind that production of the Model 12 began in 1909 and ceased around 1936 when this model became the 121, so these sights and hangers have been in place for as long as about 95 years.

I use an aerosol called "Kroil" to spray in and around these parts to help break the habit they've formed over time to stay where they are. When turning out the outer magazine-tube hangers, the outside diameter of the hangers can easily be deformed if a plug is not used to support them on the inside. I turned a cold-rolled-steel rod to a slip fit that will insert inside the hanger during the process of drifting out and back in. The outside diameter of the steel

WORKING THE REMINGTON MODEL 12 CONTINUED

ORIGINAL PAGE 18

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P18-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P18-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P18-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P18-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P18-F03. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P18-F03

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P18-F04. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P18-F04

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P18-F05. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P18-F05

plugs will vary a bit as the inside diameter of the hangers vary. Breech-Block Disassembly Remington produced two styles of breech blocks for this model. The earlier version has a slot along the left side of the breech block that houses a flat firing pin. As the Model 12 was beginning its transition toward the Model 121 (around serial number 650,000), the design changed to use around firing pin going through the centerline of the breech block as depicted here.

With both breech blocks, the firing pin also serves as the ejector. This particular type has a spring-loaded plunger inserted into the front face of the stock. As the slide moves the breech block backward, the hammer is lowered into the cocked position and the firing pin contacts the rear face of the spent case.

The spring-loaded plunger in the stock then pushes on the firing pin with enough pressure to allow the extractor to throw the case out the ejection port.

There are only a few components that comprise the breech-block assembly. To remove the firing pin and firing-pin return spring, the retaining pin is drifted out with a 1/16-inch punch while the breech block is resting on a bench block. Look over the firing pin nose for any deformation, mushrooming, or chips. Roll the firing pin in the "V" in your bench block or spin it in your drill-press chuck to see if it's bent.

It's possible Numbers 3 & 4 are originals. to make a replacement or to straighten the firing pin if it's bent. You can often reshape the

nose while staking the metal back to shape. But as long as Brownells has replacement firing pins for \$13.95, it's hard to justify the extra work. Keep in mind that an aftermarket firing pin will need to be fit for function, as wear on the hammer and breech bolt varies.

It's a tedious process, so go slowly, taking a few thousandths off the firing pin tip at a time, and then reassemble the bolt until primer ignition and ejection have been accomplished. The firing pin will surely get bent or broken if it has not been fit for correct length. The extractor, extractor plunger, and plunger spring are removed by retracting the plunger and holding it back in place while the extractor is picked from its place. The rifle here

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621CODE7B0-A988-P19-F01. Know the rights holder? Please ask them to contact us.

AG-621CODE7B0-A988-P19-F01

1 Action Bar 2 Action Bar Plunger 3 Action Bar Plunger Pin 4 Action Bar Spring 5 Barrel 8 Butt Plate, Rubber 9 Butt Plate, Metal has seen a lot of rimfire ammunition without much cleaning in this area, so the recesses were quite full of gunk. A thorough soaking in solvent to loosen most of it and then a stiff stainless steel brushing removed what was left.

When I encounter rimfire rifles with this much gunk buildup, I normally soak the parts overnight after a good 10 Butt Plate Screw 11 Carrier 12 Carrier Dog 13 Carrier Dog Pin 14 Carrier Dog Spring 15 Cartridge Stop 16 Ejector Pin spraying with Quicksilver engine cleaner. This stuff will soften some of the hardest crud I've run into and makes it much easier to remove.

After cleaning and then drying, these parts were then blasted with #270 glass beads to give them a satin finish and clean away whatever the brush and dental picks missed.

Before reassem 17 Extractor 18 Extractor Plunger 19 Extractor Spring 20 Firing Pin 21 Firing Pin Pin 22 Firing Pin Spring 23 Firing Pin Spring Guide 24 Forend

26 Forend Escutcheon 27 Forend Screw 28 Front Sight 30 Hammer 31 Hammer Bushing 32 Hammer Pin 33 Magazine Follower 34 Magazine Pin 35 Magazine Plug 36 Ejector Spring 37 Ejector Spring Plunger 38 Magazine Ring 39 Magazine Screw 40 Magazine Spring 42 Magazine Tube, Inner 44 Magazine Tube, Outer 46 Main Spring 47 Main Spring Rod 48 Rear Sight Leaf 49 Rear Sight Base 50 Rear Sight Elevating Screw 51 Rear Sight Screw 53 Receiver Bushing, Plain 54 Receiver Bushing, Threaded 57 Retainer 58 Safety 59 Safety Plunger 60 Safety Plunger Pin 61 Safety Spring 64 Stock Bolt 66 Takedown Screw 68 Trigger 70 Trigger Spring 71 Trigger Spring Case 75 Plug Screw 78 Magazine Lever 79 Magazine Lever Spring 80 Magazine Lever Pin 85 Take Down Screw Retainer bly, the recess that holds the extractor plunger and spring was given a few drops of Break-Free CLP.

The Trigger Group Before we get to the trigger group there are a couple of components that need to be removed from the action bar. The screw that retains the outer magazine

WORKING THE REMINGTON MODEL 12 CONTINUED

ORIGINAL PAGE 20

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P20-F01. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P20-F01

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P20-F02. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P20-F02

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621C0DE7B0-A988-P20-F03. Know the rights holder? Please ask them to contact us.

AG-621C0DE7B0-A988-P20-F03

tube in place is removed with a #120- 3 bit, but the outer tube can prove to be very difficult to remove. The outer magazine tube has a fine thread on the insertion end, and is usually found to be rusted in place. I've seen a few of these magazine tubes that were man-handled off with the aid of a pair of pliers. Clean the inside of the outer tube with a .270-caliber bore brush dipped in solvent, and then run patches through until dry. For rebluing, it's just as easy to do the tube and action bar assembled.

The carrier-dog spring screw will need to be removed with a #180-3 bit, which will then allow removal of the carrier-dog spring along with the cartridge stop. Cocking the hammer will reveal a small hole at the back end of the mainspring rod. Insert a piece of wire or bent paper clip into this hole and allow the hammer to go forward. The wire will retain the mainspring on the mainspring rod but relieve the tension of the spring.

I've made up a stepped punch that supports the hammer bushing during the drifting-out process. This same punch works for all early Remington slide-action rifles where the hammer bushing is used. Once the hammer bushing has been removed, the hammer and its components can be removed from the triggerguard. As is so often the case, these rifles are stored with the hammer cocked, compressing the mainspring coils.

Over time, this will cause the spring to "set" and become reluctant to open to its original length and therefore weaken the blow from the hammer to the firing pin. Twopacks of extra-power hammer springs manufactured by Wolff Gunsprings are available from Brownells at a very reasonable cost. Drift out the pin above the safety with a 1/16-inch punch, and the safety spring and plunger will come out the top of the lower triggerguard tang. The safety will slide out of the triggerguard from either side.

To remove the lifter, lifter plunger, and spring, along with the trigger, the pin directly above the hole for the trigger is drifted out with a 3/32-inch punch. These parts needed some extreme cleaning as they were badly gunked up. Evaluation Results One of the first things that the owner of this rifle and I discovered was that the rifling was quite eroded. This created a discussion as to whether rebarreling or lining the original barrel would be more feasible.

The decision was to keep the rifle as original as possible, so that meant a liner was to be installed and chambered. With either decision, the barrel needed to come off the receiver. An action wrench was made in the milling machine from a solid block of aluminum, and barrel blocks were fashioned from the same material. There are witness marks from the factory telling how this barrel and receiver should be aligned.

The firing-pin nose was damaged beyond repair, so that was replaced with a reproduction as sold through Brownells. The hammer spring was left in the cocked position for quite a few years, and this caused enough set in the coil spring to weaken its power substantially. I installed one of the replacement hammer springs made by Wolff. All of the retaining pins in this rifle are of standard diameter, and could be easily replaced should one become lost or bent.

The only aftermarket springs available are for the mainspring, but all of the springs used could be substituted with one found in Wolff's service packs. Once the liner is installed and the barreled replaced on the receiver, the entire gun will be rust blued. The stock will be refinished in a finish typical of the period.

Conclusions Controversy abounds as to whether an old firearm should be restored or "modernized." While I like to see older guns restored as closely as we can get to where they once were, as gun-fixers we should recognize that the owner of that firearm has the final call on what he'd like to see done with his gun. All we can do is recommend procedures to maintain the look of the period the particular firearm came from. After all, the bottom line is to get that firearm back into service. ■

PISTOLS

Reader Forum

BY AMERICAN GUNSMITH EDITORS OCTOBER 2004

ORIGINAL PP. 22-24

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621CODE7B0-A989-P22-F01. Know the rights holder? Please ask them to contact us.

AG-621CODE7B0-A989-P22-F01

Revolver Solver I have a .38 caliber, 2-inch-barrel revolver that has a keyholing problem. As I remember reading some time ago, this problem is caused by misalignment of the cylinder chamber to the forcing cone. If this assumption is correct, what is the correct procedure for correcting the problem? Al Skuce True, the problem could be caused by misalignment between the cylinder and barrel. When the forcing cone becomes involved, there's usually some lead spitting. Is this happening with your revolver?

If it is not, the cylinder yoke may be at the root of your problem, as could poorly reloaded ammunition or erosion of the forcing cone. There are too many possibilities to provide corrective measures for each in this space. An article on servicing S&W revolvers appeared in the October 94 issue. Unfortunately, reprints of that issue are no longer available. All is not lost, however. Brownells offers Jerry Kuhnhausen's S&W

Revolvers: A Shop Manual, which covers cylinder realignment and forcing cone work in detail.

You didn't mention whether or not your gun was a Smith & Wesson, but the information in the Kuhnhausen book can be applied to S&W clones and even Colt DA revolvers, although he wrote a separate shop manual on Colts, which is also available from Brownells. Are these books useful?

At the conclusion of a week-long session at the S&W Armorer's School, the lead instructor said: "If you forget anything we've taught you, just read Kuhnhausen's book." Python Barrel-Cylinder Gap I have a Colt Python in which someone has fired high-powered .357 Magnum shells, causing a greater gap between the barrel and cylinder. There is a star impregnated on the back of the frame by the locking pin, caused by the lugs on the cylinder.

This has also apparently closed the hole slightly in which the locking pin rides, because the cylinder is now hard to open. I can hone the hole to smooth the action on the locking pin, but I need some advice on how to clean up the frame and close the barrel gap. Ernie Garner The Python is the Rolls Royce of Colt's DA line, and has been chambered for .357 Magnum since the beginning. The single exception was the short-lived Python .38 Special. We're assuming that's the revolver you have.

The star shape you see on the frame is an imprint of the cylinder ratchet. Recoil did it. From what you say there is also damage to the frame, a .38 being much lighter than a .357. We think it's been stretched and/or bent. A clean up won't resolve this abused gun's problems. What's really needed here is a new frame and a factory overhaul. Don't Cut Springs I've been a member of the American Gunsmithing Association for several years. When I joined, I received the book *Learn Gunsmithing—The Troubleshooting Method*.

READER FORUM CONTINUED

ORIGINAL PAGE 22

I enjoyed reading it, learned a lot of valuable information, and refer to it and other books and manuals when I encounter anew problem. The one thing that bothered me when I first read the book was the reference to cutting springs. This has continued to grate on my mind to the point that I am writing you to request that you consider reviewing and revising the references to cutting springs in future additions of this fine reference for beginning gunsmiths. My advice on cutting or grinding springs is don't!

Springs today are cheap and readily available from places like Brownells, Midway, Dillon's, and Wolff. Much of the work I do is on 1911-style semi-automatic pistols. Many that I receive have reliability problems. These include light hits on the primer with a failure of the round to discharge, rounds that don't fully chamber (stovepipes), the hammer following the slide causing a second round to be discharged, and a number of sporadic problems that only went away when the springs were replaced.

One of the problems with cutting a spring is that it does not reduce the weight of the spring, but reduces its operating length. On my trigger jobs, which go from a 4-1/2-pound "hardball" trigger to 2-pound plusor-mi-

nus Bills triggers, I replace the factory main spring with a 17-pound Wolff Spring. This is the same length as the factory spring, and ensures that the hammer completes its motion to the firing pin. I have had 45s that have had main springs with one or more coils removed.

The problem was that the hammer did not progress fully through its arch and strike with the 19-pound force of the factory spring, because the spring was too short. Similar problems arise when a recoil spring is shortened. The spring retains its weight, but doesn't travel the full length of the cycle. The gun is relying on the inertia of the slide to finish the final 1/4-inch of travel to seat the round.

When initially troubleshooting problems with a 45, it may not be apparent that the spring was cut, as this problem can also be caused by the spring taking a "set." In either case, the spring should be replaced with anew factory or other weight spring. Depending on the gun, use, and bullet, I have used from a 9 to a 26-pound recoil spring. (Factory is 16 pounds.) Too light a spring will cause damage to the frame and slide and increase the recoil. Too heavy will cause stovepipes and other feeding problems.

FROM THE ORIGINAL PAGE

I keep an assortment of springs on my bench so I can adjust the cycle to conditions. The worst case of spring mutilation I've seen was a 1911 in which someone had taken a grinder to the sear spring. This gun was firing two or more rounds with each pull of the trigger. I surmised that they were trying to lighten the pull, and had ground the finger that puts pressure on the sear. One test fire and I threw the spring away and installed anew

THIS DIGITAL ARCHIVE PRESERVES THE RECOVERABLE SOURCE TEXT.

READER FORUM CONTINUED

ORIGINAL PAGE 23

four-leaf spring. The result was a reliable weapon with a short and sweet 3-pound trigger pull at a cost of \$6 for the spring. While my comments have been about 1911-style semi-automatic pistols, the same holds true for other weapons as well. A spring is designed to provide a specific pressure at a given length to operate a specific part. Stretching a spring is only a temporary fix, as the spring will return to its design specs. This might get you some repeat business, but it's not in the customer's best interests.

On the other hand, shorting a spring or grinding off apart changes the dynamics, and may create an unreliable weapon that places your customer at risk and creates a major liability for you as the gunsmith. T. Allan Palmer Lebanon, Connecticut Info on Benelli MP3S I've come into possession of Benelli MP3S pistol. It's marked, ".32 Wadcutter." There are no other markings as far as caliber. Is this the .32 S&W Long loaded with wadcutter, or a completely different round? Where can I get additional info on this pistol?

I have tried emailing Benelli in Italy, but have had no luck. Benelli USA has no info on it, and says it was imported by Sile Distributors, but I am unable to locate them on the web. Any info you can provide would be appreciated. N. F. Current Importation discontinued in 1995. The round is the .32 S&W Long carrying a wadcutter slug. Sile Distributors remains in business. Our records show two locations, one in Meriden, Connecticut and one in Yorktown Heights, New York.

Mother's Little Helper Looking at "Working the Smith & Wesson K-Frames" in the November 03 issue reminded me of a gun

my cousin bought from a policeman's widow in 1944. The gun looked ratty. It was holster worn, pitted from sweat, but the double-action trigger pull was as smooth and light as if it was a single-action pull. We wondered why it was so slick. We took the sideplate off, and everything inside and even the frame and sideplate was jeweled. Looked like the inside of a fine Elgin railroad watch.

On another subject, I had copper fouling in four rifles I had. I tried soaking the bores overnight in various products—Hoppe's Bench Rest, Sweet's 7.62 Solvent, J. B. Bore Cleaning Compound, Butch's Bore Shine—but nothing seemed to dissolve the fouling. I was told to put a teaspoon of Mothers Mag & Aluminum Polish in my brass tumbler with the walnut polishing media. The brass came out with a mirror finish. I wondered what it would do in a bore.

I bought three Turkish rifles to play with, which had pretty good bores. But, with a \$50 rifle, what did I have to lose. (I could always rebarrel.) So I put some Mother's on a mop and ran it through the bore six or eight times, and it came out black. I ran some Hoppe's to clean out the Mothers, and it still came out black. So I put some Simple Green on a mop, and it cleaned out the black. I dried the bore out, and looked down the barrel against a neon shop light. Damn near blinded me. What a shine!

And no copper fouling. You only have to use the Mother's and Simple Green (full strength) to do the bore the first time. After that, you can clean the bore as usual. I worked up some loads for the rifle, took it to the range, and put 50 rounds through it. When I got home and cleaned out the

bore with Butch's Bore Shine, it took about one-third as long as usual to clean the bore.

I haven't used the Mother's again, and the bore still shines like new. After that, I did all the rest of my rifles with the same good results. The instructions on the can say that Mother's will not scratch metal, and that hand rubbing is not necessary.

Use it until it turns black and then stop. You can find Mother's Mag & Aluminum Polish in most auto-parts store, and Simple Green on the soap aisle in any supermarket. Glen R. Reames Carson City, Nevada Crescent Single-Shot I hope you can help me find parts and info on a single-shot shotgun. The left sideplate is stamped "NO#15 Empire Ejector, The Crescent Firearms Co. 20GA." I need all the pins, a leaf spring for the lever that opens the barrel, and a forearm.

The owner would also like to know the age and value of this shotgun. The serial number is 694127. Any help would be great. Thank you. Lewis Jones Jr. If your customer's shotgun has an external side hammer, the design dates as far back as the 1890s. Crescent-Davis, the successor to Crescent Firearms, was "absorbed" by Savage Arms in 1931. The city fathers of Norwich, Connecticut, seized the Crescent property for non-payment of taxes in 1932.

Crescent's greatest fame derives from manufacturing guns for private labels. Over 100 retailers, distributors, and mail-order houses are on the list. Gun Parts Corp. shows nothing but coil springs as the top lever spring. Jack First indicates a leaf spring. Both list numerous pins. The value of the external side hammer is \$125 in 100-percent condition and

ARCHIVE IMAGE WITHHELD

The original image is not displayed while permission is being confirmed. If you are the author, photographer, or rights holder, contact editor@gunsmithmag.com and reference AG-621CODE7B0-A989-P24-F01. Know the rights holder? Please ask them to contact us.
AG-621CODE7B0-A989-P24-F01

(continued from previous page) \$30 in 60 percent. We won't speculate on the year of manufacture (a photo of the gun sent to the NRA Museum should establish the year) and recommend you tell your client not to fire modern high-brass loads. What has us somewhat confused is the word "Empire." They were double guns, are extremely rare, and are valued from \$500 to \$1000. Adjusting the M710's Trigger I'm looking to adjust the pull on a Remington Model 710.

I've been told by Remington that it's possible, but have gotten no information on how to adjust the supposedly adjustable trigger. Is there any information you can give me on how to accomplish this, or any resources you can recommend? The two front screws on the housing control pull and travel. Rotating the lower screw counterclockwise reduces tension (pull). Adjust for travel by turning the upper screw clockwise until the cocked action won't fire when the trigger is pulled.

Leave the action cocked, depress and keep the trigger depressed, and turn the upper screw counterclockwise until the sear releases. Add another one-quarter turn for clearance. The screw at the back of the housing is factory sealed with an epoxy. Mauser Followup Referring to the letter

"HSC Extraction" from Jerry Lucky in the June 04 issue, the Mauser HSC ejects just like most other semi-autos.

The ejector which pivots on the left side of the frame is a stamped multifunction part which also serves as a slide hold-open and magazine disconnect. It's listed in the Numrich catalog as a "magazine safety." Your reader should inspect it for wear or damage. I agree that magazines could also be part of the problem. I absolutely concur that high-power loads should not be used.

However, perfectly satisfactory handloads can be assembled as long as only the fastest pistol powders are used and overall length is kept to a minimum. My HSC will function perfectly as long as the C. O. L. is kept short. Hope this is helpful. Rick Weaver Chatham, Illinois Thanks, Rick, for your input. Restoring Winchester 1873 I am not a professional gunsmith, I do it as a hobby. Most of the work I've done has been on shotguns.

However, I have a family treasure that was handed down to me from my father, and it is in need of reworking. My great-great grandfather purchased this rifle new in April 1882 from Winchester. It is a Model 1873 38/40. I do not have any manuals on the rifle; I do have a schematic, but it is of very poor quality. I tried blowing it up, but it's so blurry I can't read it.

I want to put the rifle back in firing condition, but I am going to use only original parts; not because I plan to use the rifle, but because it has such great value to the family and because it needs to be done now while parts are still available.

Here is what I need to start: A good clear schematic blowup with a parts list; any publication that can guide me through the disassembly and reassembly; any parts sources that you know of including a source for original stocks. (The forend is fine, but the buttstock needs replacing) And, of course, any additional information that you deem necessary. Richard Smith Original parts and original stock? Not an easy search.

Start by calling Pennsylvania Gun Parts A schematic and disassembly/ reassembly directions appear in the NRA Guide to Firearms Assembly. Purchase the combined, hardcover edition, which includes similar material on dozens of rifles, shotguns, and handguns. Remember, your gun was built for blackpowder loads. Downloaded smokeless loads or commercially made cowboy-action blackpowder cartridges must be used to avoid damage to the rifle and anyone nearby. In no instance should .38+Por .357 Magnums be used. Not even once.

SEARCHABLE ISSUE RECORD

Archive index

Jury Clears Beretta in Accidental Shooting American Gunsmith Editors	2	Tech Topics American Gunsmith Editors	14-15
Exploring the New Taurus PT24/7 Chick Blood	3-6	Working the Remington Model 12 Dennis A. Wood	16-21
Making an Action Wrench For the Weatherby Mark V Norman E. Johnson	7-9	Reader Forum American Gunsmith Editors	22-24
Simple Pump-Shotgun Fixes: An Armorer's View Robert K. Campbell	10-13		

Rights and corrections. Images without confirmed permission remain reserved in place. Authors, photographers, and rights holders may contact editor@gunsmithmag.com. Corrections to searchable text are tracked against the source-page record.



American Gunsmith

The complete searchable archive of a technical journal devoted to craft, repair, maintenance, machining, and restoration.

GUNSMITHMAG.COM • EDITOR@GUNSMITHMAG.COM