



DEC 2020

DIGITAL ARCHIVE
EDITION

PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

A TECHNICAL JOURNAL OF CRAFT, REPAIR & RESTORATION

12

ARCHIVE ISSUE NUMBER



INSIDE THE ARCHIVE

MAUSER HSC

SIXTY YEARS OF TESTING GUNS • LINDA FOLDING STOCK • REVOLVER TRANSFER BARS • CARTRIDGE-BASED HEADSPAC...

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 204

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 • DECEMBER 2020

ISSUE RECORD

ORIGINAL DATE	December 2020
VOLUME	Archive volume not stated
ISSUE NUMBER	12
SOURCE ID	ag-69aa9effa65aaee1f0282461

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 December 2020.

2 **Sixty Years of Testing Guns**
AMERICAN GUNSMITH EDITORS • ORIGINAL PAGES 2

3 **Mausers HSc**
MARK R. HOLLENSON • ORIGINAL PAGES 3-8

9 **Linda Folding Stock**
GLEN CALVERT • ORIGINAL PAGES 9-12

13 **Revolver Transfer Bars**
ROBERT K. CAMPBELL • ORIGINAL PAGES 13-16

17 **Cartridge-based Headspace Gauge**
NORMAN E. JOHNSON • ORIGINAL PAGES 17-18

19 **Case Turning Fixture**
NORMAN E. JOHNSON • ORIGINAL PAGES 19

20 **Modifying Gun Screws**
NORMAN E. JOHNSON • ORIGINAL PAGES 20-21

23 **Reader Forum**
AMERICAN GUNSMITH EDITORS • ORIGINAL PAGES 23-24

FROM THE ARCHIVE

Sixty Years of Testing Guns

BY AMERICAN GUNSMITH EDITORS DECEMBER 2020

ORIGINAL PP. 2

Ray Ordorica is probably best known as being a professional editor, writer, photographer, and tester of firearms with prolific contributions to *Gun Tests* and *American Gunsmith* among many other magazines and books throughout the United States and Australia. *Sixty Years of Testing Guns* is Ordorica's autobiography. It certainly covers plenty of gunny lore but there are also a plethora of other interesting topics.

L'uomo universale, Ordorica's expertise includes woodworking, engraving, machining, flying, auto and motorcycle racing, hunting, tracking, trapping, hiking, law enforcement, and performing as a multiinstrumentalist. Now residing in remote Idaho, he was a Senior Editor for DBI Books in the Chicago area. Prior to that, Ordorica spent three winters in an uninsulated 12by 16-foot one-room log cabin in Alaska, the basis for his *Alaskan Retreater's Notebook*.

His autobiography also hints to the origins of Rico Morgan and that trilogy of novels: *Border Caper*, *Caracas Caper*, and *Casablanca Caper*. *Sixty Years of Testing Guns* With over eighty photographs, *Sixty Years of Testing Guns* goes in depth about Ordorica's journey as a professional editor, gun writer, novelist, photographer, wood-worker, pilot, machinist, engraver, and musician.

There are plenty of stories of meeting and working with big name personalities in the gun world, as well as motorcycle racing, flying, rock bands, a Mission to Mars, and some interesting vehicles.

He tells the tale of meeting Ross Seyfried and taking that infamous photo of Seyfried vaulting a wall during an IPSC assault course, meeting Elmer Keith and Jeff Cooper, the unique Bower-Hansen Magnum Match and other competitions, why he gave up shooting his Linebaugh revolver, great friends like Cookie and Birdie, where to get the worst coffee ever, and a host of other tales spanning decades of experiences. His essay, *Becoming A Writer*, is quite insightful.

If you've read Jeff Cooper's *Fireworks*, you'll enjoy *Sixty Years of Testing Guns* as it is more than a "gun book" in that it is a great read that showcases the wit and charm of an adventurous and varied life tapestry.

ORIGINAL SOURCE PAGE

2

HISTORY

Mauser HSc

BY MARK R. HOLLENSEN DECEMBER 2020

ORIGINAL PP. 3-8

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-E1F0282461-A2382-P03-F01. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2382-P03-F01

Firearms history wouldn't be complete without the introduction of the German manufactured HSc pistol during World War II, after development of a blowback-designed pistol dating back to 1934 at Mauser Obendorf in Neckar, Germany. Research shows that Mauser began actual production of the original HSc in late 1940, beginning with serial number 700001. Production of the Mauser HSc halted around 1946 with the final serial number (purportedly) being 971239.

The HSc pistols were produced in 32 ACP/7.65mm caliber and were made for the Nazi Military and Police. Some of those old WWII pistols made their way into the United States by returning service members coming home from the war, so you may see one of these in your shop from time to time. The Mauser HSc action is a blowback operated design that has been produced in both 32ACP (7.65mm) and 380 ACP (9mm Kurz) calibers.

The magazine capacity of the 32 ACP is eight rounds with the 380 ACP. You can clearly see the firing pin and spring in the

track of the slide, along with the safety, barrel, and recoil spring. The last three numbers of the serial number are stamped under the chamber. Removal and reassembly of the barrel and recoil spring is an awkward endeavor. These post-war pistols were imported from Germany by Interarms, USA. They were made in both 380 ACP (9mm Kurz) and 32 ACP (7.65mm). or 9mm Kurz only holding seven.

The pistol has an overall length of 6 inches, give or take, and a weight of around 24 ounces. Barrel length is approximately 3.4 inches. Total wartime production is estimated to have been approximately 252,000. The Mauser HSc pistol was then reintroduced around 1967 and imported by Interarms, USA. Research tells us that approximately 63,118 post-war pistols were produced for commercial sale. The pistols were reengineered to accept the 380 ACP/9mm Kurz cartridge, a more popular cartridge in America.

However, many were also sold in the original 32 ACP chambering. Accordingly, approximately 18,868 32 ACP pistols and

39,250 380 ACP pistols were produced as post-war models. These post war models had been redesigned from the original HSc, now sporting a separate (removable) backstrap on the grip frame. The design of this particular pistol is unlike others in its class. First, there is no slide lock or release external to the pistol. It has an internal slide lock that is activated by the magazine.

It is awkward to disassemble for cleaning, has a very delicate firing pin, and familiarization with how this pistol operates safely must be conducted when working on them. This is due mostly to the fact that when loading the pistol, the magazine, whether empty or loaded with live rounds, serves to unlock the slide and chambers that first round when the magazine is inserted. So the owner/user must take some extra time at the range getting used to this type of operation to avoid any unintentional discharges.

This design, without a doubt, caused this particular pistol to fall from popularity. The pistol on my bench today is a post-war model imported by

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-E1F0282461-A2382-P04-F01. Know the rights holder? Please ask them to contact us.
AG-E1F0282461-A2382-P04-F01

Interarms, USA, and was manufactured in 1972. The pistol is a numbers-matching piece in the original box (blue) with an original owner's manual and associated paperwork. The manufacture date is handwritten in the accompanying owner's manual. Serial numbers on this pistol were found on the right side of the slide and on the left side of the frame on the trigger guard. The last three digits of the serial number were later found on the bottom of the barrel lug underneath the chamber.

When the slide is locked to the rear, the safety applied, and magazine is inserted, the slide will close and the hammer will remain. During reassembly, you will insert the detents and spring into the hole in the slide and after the safety is reinstalled, insert the extractor into the slide by pressing it against the detent, compressing the spring until it is fully seated in the slide. cocked. This pistol was very dirty from having been carried but in overall good shape. It test fired well, with only a couple jams.

The pistol came to me for inspection, deep cleaning, and test firing/sighting in. Finally! An HSc in the shop without a broken firing pin! A review of my American Gunsmith library found that this pistol has

not previously been covered here. No better time than now, I say. Especially with a complete and unbroken specimen on my bench to work with!

Disassembly As mentioned previously, the basic design of this pistol differs from others on the market (then and now) and, therefore, disassembly for cleaning can be awkward. To begin, remove the magazine and pull the slide all the way to the rear. While holding it there, visually inspect the barrel breech to ensure there is no live round in the chamber. Work the slide a few times to be sure. When absolutely certain the pistol is not loaded, re-insert an empty magazine and pull the slide to the rear.

The slide will lock back. Remove the slide and you will find that you cannot simply pull the slide back and release it like other semi-automatic pistols available today. The slide stays locked back in the open position. This is normal. To close the slide, insert the empty magazine back into the magazine well. When seated, the slide closes automatically. There is no external slide release on this pistol.

Now that you have familiarized yourself with the functioning characteristics of the pistol in front of you, move forward with

disassembly. Check again to be sure the pistol is unloaded. You now want to have the hammer (4) cocked to the rear—so if it is not, do so now either by working the slide or by cocking the hammer with your thumb. Once the hammer is cocked, place the safety catch (15) in the ON or SAFE position. The “S” will be showing when properly engaged.

The slide should be closed at this point, the hammer cocked, and the safety ON. The magazine (11) should also be removed at this point. You will need two hands to remove the slide (2). Hold the pistol so that you can depress downward on the barrel latch (21) located on the inside front of the trigger guard. Use your finger or a non-marring tool to push downward on this pin. While holding it down, move the slide forward about a 1/4" or so and lift up on the rear of the slide to separate it from the receiver.

If you cannot get the slide to come loose, chances are the safety is back in. The long bar at the top of the frame with the hook on the end is the slide lock/ejector. Note the hammer is still cocked to the rear.

MAUSER HSC CONTINUED

ORIGINAL PAGE 5

the OFF position (red dot showing). Double check this if you're having trouble getting the slide to lift off of the receiver. Do not pry it off under any circumstances. With the slide removed from the receiver, the barrel (14) and recoil spring (36) need to come out. The original owner's manual states you can use the base tip of the magazine to push the barrel forward in the slide to clear the extractor, then lift the barrel out of the slide, breech end first.

This is an awkward removal, even more so when re-assembling the barrel into the slide. I personally like to clamp the slide in a padded vice upside down, then use a piece of plastic to push the barrel forward in the slide. To lower the hammer from its cocked position, pull the hammer rearward and use a screwdriver to pull the sear away from the hammer hooks, then gently lower the hammer. This relieves tension on the hammer spring. In the same hole is a hollow pin that retains the magazine release button.

Once that pin is removed, pull the hammer spring assembly out from the frame. barrel forward in the slide until I can lift the barrel breech clear of the extractor and the slide breech face. Once you accomplish this, the barrel and recoil spring come out and can be separated for cleaning. This is as far as you need to go with typical cleaning and lubrication of the pistol during normal use. To continue with disassembly, turn the slide (2) upside down on the bench.

Using a pin punch, depress the firing pin (19) forward so that it protrudes through the breech face, then lift the rear of the firing pin base upwards just enough to seat it in a notch in the slide. Your goal here is to move the firing pin out of the way of the safety catch (15). Once out of the way, use your punch to press against the safety catch from the inside of the slide. The long leg with the dog leg is to the left side and presses up against the frame itself.

The shorter spring leg is to the right of the frame and presses downward against the top of the trigger. The assembly is held in place by a frame pin. slide towards the left. Once started enough, you can insert a screwdriver tip in between the right side of the slide and safety catch. Push the safety catch out towards the left until you can grab the safety and pull it all the way out.

There is a spring (35) and detent (27) that secures the safety but it won't fly out as it is trapped in a small cutout slot in the slide. With the safety catch removed, push downward on the firing pin (19) to allow it to drop back into the firing pin channel. Use a screwdriver to lift up on the front of the firing pin spring (34) so that you can remove the firing pin and spring upward and out of that channel, firing pin nose first. The firing pin used in this pistol is fragile and is easily broken.

Keep this in mind when deciding if you should use this pistol as a daily carry or shooter as you will be replacing the firing pin often if you do so, provided you can still buy them. When reinstalling the firing pin, place the lug located on the firing pin downward into the firing pin channel in the slide for proper reassembly. With the safety catch and firing pin removed from the slide, remove the extractor (20) by pulling upward on it and lifting it out of the seat in the slide at the ejection port opening.

Turn the slide muzzle end down and tap it on the bench while carefully watching for the extractor plunger (27), extractor coil spring (35), and safety plunger (27) as they drop out of the tunnel in the slide that retains them. Yes, both plungers are identical on this model pistol. They are also nearly extinct when trying to replace them, as is the extractor spring, so

MAUSER HSC CONTINUED

ORIGINAL PAGE 6

Also note the relationship of the magazine safety that controls the sear spring (center of photo). The sear is underneath the magazine safety. be very careful removing these so that you don't lose them. With that completed, the only item left to remove from the slide is the rear sight (22) and that is simply drifted out of the dovetail from left to right. Moving on to the frame (1), it will look a little intimidating at first but it is a very simple design to work with.

With the grip panels (9 & 10) still in place, I like to remove the Also note the small round pin protruding upward that will be positioned downward when reinstalling into the slide, with slide upside down. These firing pins are very prone to breakage. Good news is that newly manufactured firing pins are still available—for a price—and must be fitted.

The difference between the magazine followers is obvious: magazine on right is for use with hollow point cartridges and has the angled relief cut down both sides of the follower while the original magazine on the left has the Mauser name stamped on the bottom of the floor-plate. barrel latch or takedown pin (21) and the barrel latch spring (31).

Using a flat bladed screwdriver of like size, insert the blade into the cut in the barrel latch from the top inside of the receiver, then depress the barrel latch downward all the way. Turn it 180 degrees or a half a turn. This will allow you to release and pull the barrel latch out of the frame completely. The barrel latch spring (31) should be attached to the barrel latch during removal. If not, look for it in the frame. Next, remove both grip panels (9 & 10) by removing the two grip panel screws (38).

Laying the frame down on the bench left side up, lift the trigger bar (7) off of the trigger (6) where it is retained by the pin stud at the top left side of the trigger. You'll need to move the wire spring leg (33) that places tension on the bottom of the trigger bar out of the groove in the trigger bar to fully release the bar from the frame. That wire spring—called the trigger bar spring (33)—is attached to the frame on the other end by peening it into the groove for it in the frame.

It is not necessary (nor should you, if possible) to remove that spring fully from the frame. With the trigger bar removed, remove the trigger (6) and trigger spring (32) by drifting the trigger pin (25) out of the frame from left to right. Hang on to the trigger spring and note how it sits in the frame when reinstalled. The longer leg with a dog leg on one end rests against the front of the frame on the left side of the trigger, while the short leg rests on the trigger itself towards the left side of the trigger.

If not done already, lower the hammer (4) to take the tension off of the hammer spring (28). Do this now as you cannot simply pull the trigger to do it. Pull the hammer rearward with your thumb, then depress the sear bar (5) forward so that hammer hooks release and you can slowly lower the hammer to the down or into the forward position. With that done, drift or simply push out the magazine release pin (37).

This pin retains the magazine release/hammer spring/hammer strut assembly/backstrap along with a hollow pin in the frame (not shown in schematic). Once the magazine release pin (37) is removed, push out the frame hollow pin (not shown) so that you can remove the magazine release (17), hammer spring (28), and hammer strut (16) assembly. To disas-

MAUSER HSC CONTINUED

ORIGINAL PAGE 7

semble this assembly, place the top of the hammer strut (16) downward on the bench and press downward on the magazine release (17). Once pressed downward about three quarters of an inch, turn the magazine release one quarter turn, then slowly allow the spring pressure to decrease while holding onto the magazine latch. Reassemble this unit in reverse. You can now remove the backstrap (3). Pull rearward on the backstrap at the bottom where it fits onto the frame.

It was previously held in place by the magazine release pin (26) and hollow frame pin. Once pulled free at the bottom, tilt the back strap upward and pull it down, releasing it from the top of the grip frame area. You can now remove the hammer (4) by pushing out the hammer pivot pin (23) from the left side of the frame out to the right. Note that there is a lug on the hammer pivot pin.

When correctly installed in the frame, the lug is pointed upwards in the 12 o'clock position and is seated flush into the right side of the frame (during reassembly of the hammer). As you remove this pin, you will find that the hammer is under spring tension. The tension comes from the magazine safety (18) and sear spring (29). I included reassembly tips for the hammer below. The last pin in the frame is a small pin located at the top of the frame called the sear pin (26).

This pin retains the ejector (8), magazine safety (18), ejector spring (30), the sear (5), and sear spring (29). You want to be extra careful here so that you don't lose either of the two small springs, especially the ejector spring (30) as it is nearly impossible to buy anymore. Begin by using alike-sized pin punch to press on the sear pin (26) from left to right, moving it just enough to withdraw the punch and pull the ejector (8) and ejector spring (3) off the frame.

Then, while holding downward on the magazine safety (18) and capturing the sear spring (29) at the same time, push the sear pin (26) the rest of the way through the frame to remove the magazine safety (18), sear spring (29), and sear (5) from the frame. This completes disassembly of the pistol. You will notice the trigger bar spring (33) is still in the frame. It is retained in place by crimping the channel where the right side of the wire spring leg rests.

If you have to remove this spring due to breakage or bluing, use a small wedge-shaped tool or properly-ground bit to pry apart the channel walls so that you can pull the wire spring out. Make sure you can still get a replacement spring before attempting to "upgrade" this spring as they are difficult to find. When replacing, use a punch to crimp or collapse the groove edges that retain this trigger bar spring to the receiver. Just don't overdo it. Crimp just enough to secure that part of the spring in place.

The other end rests in a groove made for it in the bottom of the trigger bar (7) when reinstalled properly. Reassembly Tips Reassembly is straight forward and performed in reverse of the above firing order. As promised earlier, here is a tip for reinstallation of the hammer.

Once the sear assembly is reassembled and you are ready to reinstall the hammer, begin by pressing downward on the magazine safety (18) and sear spring (29), essentially lifting the back end of the magazine safety upward enough so that you can insert the hammer into the frame.

The magazine safety and sear spring will place tension on the hammer when trying to install the hammer correctly, so press downward on the hammer and insert a pin punch from the left side of the frame to capture the hammer, magazine safety, and sear spring interface. Then, insert the hammer pivot pin (23) from the right side of the receiver, making sure that the lug on

the pin faces upward or is in the 12 o'clock position when inserting it fully into the frame.

The pin and lug should be flush into the frame when properly reinserted, AND more importantly, you should be able to cock the hammer at this point. If the hammer cannot be cocked rearward, you did not get the leg of the magazine safety (18) up high enough when inserting into the center of the hammer. Repeat the above process until you can cock the hammer and the sear engagement is correct.

To test the hammer and sear engagement, insert the trigger bar (7) and a magazine (11), then pull the trigger rearward while holding onto the hammer so that it does not fall freely into the frame. You just want to ensure the sear is engaging with the hammer and when pulling the trigger that the hammer falls. You can also check double action operation too. Just place a finger of your weak hand over the trigger bar (7) where it hooks onto the trigger pin so that the trigger bar doesn't fall off during testing.

When reassembling the slide, this can be awkward as well. First, push the safety catch plunger (27), the extractor spring (35) and extractor plunger (27) into the extractor tunnel in the slide starting at the area of the extractor seat (ejection port opening). Once the above unit is in the extractor tunnel, turn the slide over and insert the firing pin and firing pin spring into the channel.

Make sure you depress the firing pin forward and upward so that the firing pin catches on the slide and is out of the way as you reinsert the safety catch (15). Next, insert the safety catch fully into the slide and then press down on the back of the firing pin so that it correctly interfaces and functions with the safety when the safety is placed in the ON and OFF positions. Once that is correctly in place, turn the slide over so that the right side is

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-E1F0282461-A2382-P08-F01. Know the rights holder? Please ask them to contact us.
AG-E1F0282461-A2382-P08-F01

1 Frame 2 Slide 3 Backstrap 4 Hammer 5 Sear Bar 6 Trigger 7 Trigger Bar 8 Ejector 9 Grip, Left 10 Grip, Right facing upward. Use your strong hand to insert the extractor (20) into the seat, pressing rearward against the extractor spring and detent until the extractor drops down into its seat. Another awkward reassembly is the barrel (14) and recoil spring (36) assembly into the slide.

When pressing the barrel forward and downward into the slide, the barrel has a tendency to catch on the inside of the slide at the hole in the slide muzzle. I found by inserting a plastic pen into the muzzle end of the slide and pressing that pen into the barrel muzzle allows moving the barrel muzzle around while pushing the barrel down into the slide.

This movement will help align the barrel muzzle with the hole for the barrel in the slide so that you can fully insert the barrel down into the slide and seat the barrel past the breech face all while clearing the extractor.

This is best accomplished by clamp- 11 Magazine 12 Magazine, Finger Rest 13 Barrel, 32 14 Barrel, 380 15 Safety 16 Hammer Strut 17 Magazine Release 18 Magazine Safety 19 Firing Pin 20 Extractor 21 Takedown Pin 22 Rear Sight 23 Hammer Pivot Pin 24 Hammer Strut Pin 25 Trigger Pin 26 Sear Pin 27 Extractor Pin 28 Mainspring 29 Sear Spring 30 Ejector Spring ing the slide in your padded vise up-

side down again, at least for me anyway. The slide assembly can now be replaced onto the frame.

You will not need to depress the barrel catch when installing the slide. It will simply drop down and latch onto the frame. Another interesting item on this pistol is the magazine (11). The owner of this pistol told me that after he purchased it new in the 1970s, he had trouble with it feeding, extracting, and ejecting hollow point ammunition. He contacted Interarms and they sold him another magazine that had a different follower.

The original magazine has the Mauser stamp on the bottom of it but there are no markings on the "special" magazine made for hollow point ammo use. Comparing them side by side, the only difference is the shape and angle of the follower.

The original magazine follower is rounded and has a slightly lower Mauser Model HSc Pistol (Post 1945) (Specifications subject to change without notice) 31 Takedown Pin Spring 32 Trigger Spring 33 Trigger Bar Spring 34 Firing Pin Spring 35 Extractor Spring 36 Recoil Spring 37 Magazine Release Pin 38 Grip Screws (2) angle in the magazine. The "special" magazine has two relief cuts down both sides of the follower at the top and has a slightly higher angle on the follower.

Whether the difference in the angle itself or the relief cuts on the follower (or both) made for better feeding of hollow point ammunition remains a mystery. For me, both magazines fed ball and hollow point ammu-

nition similarly, with no jamming. On occasion, the pistol would jam when down to three rounds left in each magazine. This did not happen often but it did happen with both magazines.

My guess is that recoil dislodged the cartridges forward a tad in the magazine and provided for an increased angle when trying to chamber during firing. Common ball ammunition worked well, as did Winchester Silvertip hollow point ammunition. Since the 1980s, I have always counted on Winchester Silvertip hollow point cartridges to feed superbly in semi-automatic pistols, especially when used in pistols that seemed to have jamming problems.

Seldom have I heard of a semi-auto pistol having problems with Silvertip ammo, due mostly to the shape of the bullet itself. It just works well. Plus, the soft lead bullet opens up exponentially when fired into an object, making the round a great self defense cartridge. I am sure there are better cartridges out there, but Silvertip rounds seem to correct jamming issues in a variety of semi-auto pistols where no amount of magazine feed lip adjustments make a difference.

This little Mauser-designed pistol did its fair share of work over the years with a design that withstood the test of time. No doubt the awkward disassembly, lack of an external slide release, and a very fragile firing pin made this little gem fall from popularity in the shooting world. But they are fairly accurate, comfortable shooting pistols built on a tried and true design. AG

RIFLES

Linda Folding Stock

I wanted a side-folding stock for my Linda Carbine. So I built one.

BY GLEN CALVERT DECEMBER 2020

ORIGINAL PP. 9-12

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-E1F0282461-A2383-P09-F01. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2383-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-E1F0282461-A2383-P09-F02. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2383-P09-F02

I have been enjoying my Linda PC carbine from Wilkinson Arms (WilkinsonArms.com). It has a cool, retro look, is fun to shoot, and has proven to be accurate and reliable. It is a 9mm Luger direct blow back design with a cylindrical receiver, barrel shroud, and tube stock that resembles sub-machine guns like the Sten gun. The bolt telescopes over the barrel similar to the Uzi, allowing the 16.5" barrel to be set back in the receiver and significantly shorten the overall length.

The standard stock is fine for the iron sights but the amount of drop prevents a good cheek weld when using optics such as the red dot that I installed. I initially thought that I would make a fixed stock like the original but with the tube extending straight back. I thought I'd try a folding stock instead. The Linda is only 21" long with the stock removed so a folding stock would allow the carbine to be carried as a compact package.

Wilkinson Arms offers an adapter for use with an AK-type under-folding stock and provides that stock on the LE-3 version.

The standard Linda stock has a significant amount of drop; this is fine for iron sights but is too much for optics mounted on the rail. Under-folding stock didn't appeal to me; I was more interested in one that folds to the side and allows the carbine to be operated while folded. The bolt handle is on the left side so I wanted the stock to go to the right.

I looked at folding stocks and stock adapters for other models but the Linda is an unique design. Wilkinson Arms offers an AR stock adapter and there are hinge kits for AR stocks but I wanted to stay with the original style stock. The cost of the adapter and hinge kit adds up quickly as well so I decided to fabricate one myself. I started by measuring the dimensions on the rear of the receiver and making a drawing.

The receiver has a horizontal lug that retains the fixed stock along with a screw in the bottom of the receiver. I decided to use the same mounting system and add a hinge that allowed the stock to pivot to the right side. I wanted the hinge assembly to blend

in with the shape of the receiver. I sketched some ideas, picked the one that looked best, and added it to the drawing.

The folded stock has to clear the ejection port cover on the right side of the receiver when the cover is open and allow the cover to open when it's closed. This required clearance determined the location of the vertical centerline of the hinge pin. I chose to attach the new stock at the same location relative to the rear of the receiver. Since it extends horizontally, it required a different design for the butt plate.

After more sketching, I came up with a design for a latch to hold the stock in the extended position. I rounded up pieces of steel in 0.125", 0.188", and 0.250" thicknesses. I used a cutoff saw for the rough cuts, then a hacksaw, and finished with hand files. A drill press, TIG welder, disc sander, and Dremel tool were used as well. I

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-E1F0282461-A2383-P10-F01. Know the rights holder? Please ask them to contact us.
AG-E1F0282461-A2383-P10-F01

started with making a mounting bracket like the original but with provisions for the additional hinge plates. I added a section on the bracket under the lug to act as a spacer for the fixed hinge plate and welded the pieces together. I made the hinge plates from 0.25" thick steel and used 0.50" round bar stock for the hinges. Cutting a piece of the round bar to length for the fixed hinge plate, I drilled a 0.180" diameter hole for the pin and filed a 0.35" wide flat on it so it would set squarely on the plate.

I aligned and welded the bar on the plate "ears" and then cut out the center section of the bar. The rotating hinge plate was made in the same manner. I carefully filed the hinge bars to get a precision fit which required frequent assembly checks until the parts went together as needed. The fixed hinge plate is keyed to the mounting bracket via a notch on the bottom that locates the plate side-to-side on the bracket. I used a 6-32 screw to attach the hinge assembly to the mounting bracket during the fit-up checks.

The original plan did not include its use in the final assembly but I later decided to keep it and add a second screw as opposed to welding the parts together. This allows me to remove the hinge assembly from the mounting bracket in case I want to make any changes to the parts or fix any problems. At final assembly, thread locker was added to the screws. After I got the hinge parts finished and attached to the mounting bracket, I started on the latch assembly.

I cut the latch from 0.25" Latch to hold stock in the folded position; fixed hinge plate with latch to hold stock in the extended position; mounting bracket; pivoting hinge plate; hinge pin and latch pin. Below center: New mounting bracket compared to the standard stock. Far steel, added a slot in the fixed hinge plate, and drilled the hole for the pin that the latch pivots on. It also required a hole in the spacer for the latch spring.

After much trimming and filing, I got the latch shape finalized and fit into the hinge plate. I used 0.062" diameter welding rod as a temporary pivot pin so I could assemble and disassemble the parts to check the fit-up. The rod was replaced by a roll pin in the final assembly. I found a small spring from a trigger kit that was the right size and installed it in the spacer on the mounting bracket to hold the latch closed. A small pin was added to the latch to retain the end of the spring.

The latch is released by pushing it to the left. One issue I discovered with the stock in the folded position was the latch would pivot over center and prevent the stock from engaging the latch when the stock was unfolded. I bonded a small piece of shim stock to the fixed plate to prevent this, which required a minor adjustment to the notch in the latch. I decided to add another

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-E1F0282461-A2383-P11-F01. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2383-P11-F01

latch to hold the stock in the folded position so it would not swing around uncontrolled when not in the extended position. This turned into a fair amount of cutting and trimming as I had not incorporated it into the original design. The only means I could think of doing this was to add a pin to the rotating hinge that the latch could capture. It's not the most elegant design, but it works fine.

I would have preferred using a compression spring on this latch as I did on the other one but had to use an extension spring. The latch on the bottom left retains the stock in the extended position and is pushed to the left to release and allow the stock to be folded. The latch on the upper left is pushed downward to release the stock from the folded position. The latch retains the pin to keep the stock in the folded position.

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-E1F0282461-A2383-P11-F02. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2383-P11-F02

I used a piece of 0.875" OD steel tubing for the stock which matched the diameter of the original stock. The new stock was mocked up with a wooden dowel and butt plate to check for length of pull, proper cheek weld, and adequate clearance with the stock folded. I cut the steel tube and new butt plate to size, welded them together, and then welded the tube to the pivoting hinge plate. Threaded rod was used with nuts and washers to hold the parts together during welding.

I contoured a piece of walnut to the shape that I wanted, stained it to match the fore end grip, and installed it on the butt plate with two wood screws. When tucked in along the right side of the hinge plate. This latch is located on the left side of the receiver, above the other latch, and is released by pressing it downward.

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-E1F0282461-A2383-P12-F01. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2383-P12-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-E1F0282461-A2383-P12-F02. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2383-P12-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-E1F0282461-A2383-P12-F03. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2383-P12-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-E1F0282461-A2383-P12-F04. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2383-P12-F04

the stock assembly was complete, I sprayed the steel parts with flat black paint to match the rest of the carbine. The new folding stock assembly has the same length of pull as the original stock. The hinge assembly only added 0.5" to the length of the receiver and when folded the overall length is a compact 21.5". The new stock and hinge assembly weigh 22.8 ounces compared to 11.0 ounces for the original fixed stock. The ejection port cover will open with the stock folded.

New stock has zero drop which provides a good cheek weld for an optic. The hinge and stock assembly weighs 22.8 ounces compared to 11.0 ounces for the original fixed stock. Part of the weight increase is due to the tube 0.095" wall thickness which is probably thicker than the original stock tube. I chose the heavier wall to give me a little more material to work with when welding. The increased weight of the new stock improves the balance when the carbine is shouldered.

The new stock provides a good cheek weld with the red dot sight and the carbine can fit in a relatively short case, making it less conspicuous when carried. I had not planned on firing the carbine with the stock folded but after it was all together, I had to try it a few times to make sure it functioned properly. Works great! AG Far I wanted to keep the design as small as possible and blend in with the receiver profile. 5" to the receiver length.

PEOPLE & COMPANIES

Revolver Transfer Bars

BY ROBERT K. CAMPBELL DECEMBER 2020

ORIGINAL PP. 13-16

I recently had a customer bring in a Ruger single action revolver from 1962, before the safety refitting. A young friend in the shop wanted to know if this was rarity. While there seems to be a number of people desiring it as a collectible, I feel its only value was as a nice 1962 single action revolver that doesn't offer anything newer Rugers don't while being potentially less safe. I cautioned the young fellow not to sell the revolver until after having Ruger upgrading it for free.

These older, unmodified Ruger single actions are becoming less common but are far from rare. It is one thing to own something for personal use and another to offer it for sale to a potentially unaware buyer having significant, correctable, and non-obvious safety deficits compared to newer handguns. If a new owner handled the older, unmodified Ruger single action like a newer model, it could cause problems.

The modern transfer bar action isn't "lawyer inspired" to stop lawsuits, although it certainly is a good improvement on liability grounds. Even before we had such a litigious society makers were concerned with producing a revolver that offered greater safety and transfer bars do that. Transfer bar actions are nothing new but their application in modern centerfire revolvers is relatively recent.

Iver Johnson Safety Automatic revolvers were designed with a type of transfer bar around 1895; prior to this, most revolvers were carried with the hammer on an emp-

ty chamber. Some revolvers featured a rebound type lever in the action, while others, such as the Starr, featured a notch in the cylinder that allowed securely locking the hammer nose in a notch in the cylinder between chambers.

A similar custom cylinder was once offered for the Colt 1860 revolver and the modern mini revolvers from North American Arms offer it as standard. This neatly solves the problem of an accidental discharge—provided the user always uses the safety notch. The Colt Single Action revolver has been so popular and widely copied that several types of action changes have been invented to make it safer.

The original Colt featured a hammer-mounted firing pin, resting on the primer on a loaded chamber and susceptible to discharge if dropped. Given the geometry and balance of the revolver, such a drop could end up directly on the hammer with an upward oriented muzzle. It is less likely an object could strike the hammer while holstered but this has been reported, such as incidents in which contact with brush raised the hammer enough for it to slip and fall.

In its day, everyone seemed to know to load one, skip a chamber, load four more, cock the hammer, and lower it on an empty chamber as accepted practice. While newer designs prevent these issues, older revolvers still exist, which may confuse some owners. Some argue the chamber-empty practice should always be used,

while others push for modernization. Iver Johnson went with the latter, which is the ideal approach for more casually interested shooters.

Ruger redesigned the Single Action Army design used in the Ruger Blackhawk and Super Blackhawk to a transfer bar system similar to the Ruger Security Six double action revolver, which is also similar to the Charter Arms revolver and much earlier Iver Johnson. Ruger recalled their older models for retrofitting, a conversion that remains available for those revolvers, most of which were manufactured prior to 1972.

Colt, meanwhile, had the safety notch hammer that was pulled slightly back to remove the firing pin from contact with the cartridge primer. These notches are easily broken. Again, not a real answer to the problem. Ruger went one further, and this addition is not as well understood or appreciated. New Model revolvers are loaded with the hammer down, not at half cock. When the loading gate is open the cylinder spins free.

It isn't necessary to have it cock into place as there is no need to index the cylinder and load only five cartridges in a certain procedure. While we are concerned primarily with single action revolvers here, transfer bars on double action revolvers also operate in this manner. The hammer does not strike the firing pin; there is a step in the hammer face in these designs. When the firearm fires, the hammer strikes the transfer bar which

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-E1F0282461-A2384-P14-F01. Know the rights holder? Please ask them to contact us.
AG-E1F0282461-A2384-P14-F01

smacks the firing pin. The transfer bar is attached to the trigger. As the trigger is pulled, the transfer bar rises into place and in to the proper position to allow the hammer to fall on the transfer bar, striking the firing pin. The trigger must be pressed to the rear for this firing to occur. When the hammer is at rest the transfer bar is positioned so that the hammer cannot move forward even if struck a direct blow.

If you slip while cocking or lowering the hammer and the trigger isn't fully to the rear, the revolver will not fire. The combination of a modern transfer bar ignition and loading the revolver while the hammer is down is a tremendous advantage. I think this explains my caution to my young friend and his reputable shop. The modern revolvers are much better in every regard in my opinion. Older revolvers with screws holding the hammer—a The action isn't terribly complicated. giveaway—may have the original system.

Modern revolvers have pins holding the hammer. If Ruger changes the revolver over to the safer system the frame remains the same and the original parts are returned with the gun. This is a can't lose situation

in every way. After Iver Johnson introduced their Hammer-the-Hammer transfer bar safety system with advertisements of a hammer pounding the firearm's hammer without a discharge, other makers had to catch up. A hammer block was introduced in both Smith & Wesson and Colt revolvers.

The hammer block works in a different manner than a transfer bar—practically the opposite, in fact. The hammer block slides out of the path of the hammer just before firing and allows the hammer to strike the firing pin. Smith & Wesson also incorporated a hammer rebound into the hammer block design. The hammer retracts after firing as the top of the rebound slide moves the hammer to the rear. Far The Colt, below, features a firing pin mounted on the hammer. Only five rounds for this one!

Competition moved some makers to safety improvements. In the case of the Italian makers of single action revolvers, import regulations as a result of the 1968 Gun Control Act demanded improved safety features. Some of the answers were ridiculous, almost monstrosities. I recall a Hämmerli single action revolver, well made of good

material, with a small wheel safety on the hammer. It was turned forward to make the hammer safe and turned upward to fire.

I would wager this wheel was intended to beat import restrictions and gain points, not for actual use. I think most users simply loaded five cartridges. Another safety touted was to move the cylinder base pin to the rear to block the hammer. This was very slow and not a real answer. A notched cylinder was not part of this design effort as far as I know.

With Charter Arms, then Ruger, and later Dan Wesson introducing double action revolvers with transfer bar ignition, it was a matter of time until makers began to design a single action type revolver with a transfer bar system. As a point of interest, Winchester developed a lever interlock safety as early as 1873 for their lever action rifles. This prevented firing if the lever and bolt were not fully closed.

The safety notch is regarded as more reliable in these rifles; some of the early revolver rebounding hammer designs were thin in cross section. While a laudable effort, they were not robust enough to

REVOLVER TRANSFER BARS CONTINUED

ORIGINAL PAGE 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-E1F0282461-A2384-P15-F01. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2384-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-E1F0282461-A2384-P15-F02. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2384-P15-F02

prevent discharge if the revolver were dropped on the hammer. In a true rebound type, the trigger spring will force the hammer back as the sear moves into a recess in the hammer, preventing forward hammer movement. This seems an elegant system if the parts are strong enough to prevent hammer movement. Interestingly, all double action revolvers are not necessarily safer than single action revolvers. Colt did not introduce the Positive Lock until 1906.

The early Colt New Service and New Police did not have the effective Colt Positive Lock. The Positive Lock is simply machined parts added to the action in the right place. A pin in the trigger and machined cuts in the frame were the high points. The Colt is a hammer block, not a transfer bar. Webley revolvers also feature a type of hammer block which official literature referred to as the mainspring auxiliary. This system retracts the firing pin, an unusual step.

In the break top or hinged frame revolver the firing pin safety is intended in part to make it less difficult to break the revolver open. Most such designs are not particularly strong. The mechanical design also influences safety procedures by the shooter. With the new Ruger being the lone excep-

tion, single action revolvers were loaded by bringing the hammer to half cock. The loading gate was opened, the cartridges loaded one at a time, and the cylinder clicked as it was indexed.

After loading the cylinder the hammer must be cocked fully back and then lowered on an empty chamber—or unsafely on a loaded one. I am personally aware of at least one negligent discharge from a shooter lowering the hammer after loading the firearm. Transfer Bar Types There are several types of transfer bar systems. It might seem all will have an upside down L-shaped hammer, this isn't always true. The Uberti revolvers have a different transfer bar than the Pietta riding close to the hammer.

The Freedom Arms centerfire revolvers transfer bar actually rides on the hammer itself. The upper portion of the hammer of the Freedom Arms revolver has an internal channel, slightly curved. The hammer will not contact the firing pin the transfer bar Far pushes the firing pin. The Ruger features a more squared off hammer and the transfer bar has more loose motion. Smith & Wesson revolvers with the frame-mounted firing pin look like a transfer bar action but they are not.

With this understood, many shooters feel that the original action without the transfer bar was smoother on the single action revolver. This may be true from the factory but it isn't difficult to modify the transfer bar revolver for greater smoothness. There are more parts but they don't over complicate things for a good gunsmith. I improve smoothness in the action by eliminating hard spots and burrs. The bottom line is always to be careful and concentrate on not removing metal.

Learn how to disassemble the individual design you are working with. Use proper hollow ground screwdrivers. Most of the transfer bar action single action revolvers are not terribly complicated, though double action types are more complicated than the single actions. Getting the hammer strut smooth is a key point. The end where it sets in the hammer is sometimes rough. I won't compare castings to forgings and their differences but they are there and sometimes castings particularly benefit from careful polishing.

AFTER POLISHING THE BALL END OF THE HAMMER STRUT, YOU'LL NOTE A FAR

REVOLVER TRANSFER BARS CONTINUED

ORIGINAL PAGE 16

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-E1F0282461-A2384-P16-F01. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2384-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-E1F0282461-A2384-P16-F02. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2384-P16-F02

Far It seems to work well. While this is okay with a very careful user, perhaps an empty cylinder under the hammer may be a better choice. Smoother action as the hammer is cocked. It doesn't take much to get this part very smooth. Burrs on the mainspring and mainspring seat are another priority. The spring should not bind during the operation of the trigger action. The spot where the hammer strut fits into the hammer needs polish in almost every example you will encounter.

I put emery cloth on a rod with a very small diameter and gently polish this area. An alternative is to roll up a sliver of emery cloth and put it on the end of a drill and spin the drill. As a caution, some like to polish the hand or pawl that serves to index the cylinder. It is too easy have an adverse effect on timing by over polishing the hand. The engagement between the ejector star and hand must be solid. I would have to find a rough edged part or burrs to polish this area at all.

I have worked with Colt, Uberti, Traditions, and Ruger single action revolvers for years. I have been asked to loosen the loading gate on some examples. Sometimes I cautioned the customer against it and they did not pursue this step. Other times the gate, particularly on Rugers, is not just tight but stiff. The loading gate spring may be clipped a bit to lower the force needed to open the gate.

Simply bending the loading gate spring downward will make for easier loading; just don't bend the spring so much that it allows the loading gate to open during recoil. On both single action and double action revolvers the cylinder bolt slides into a recess in the cylinder, the cylinder notch, to lock the revolver up tight during firing. Be careful, whichever revolver you are working with, so that you don't lose the spring that powers the bolt stop.

The bolt stop is often rough even in a normally well-fitted revolver. This is another area to go slow. Just the same, 600 grit works well and makes the bolt stop

smoother. All of this judicious polishing work adds up to a smoother action. As you go over the action, polish the hammer and the sear as well as any rough edges, but only so much. Don't remove too much metal and don't change the angles. This is the same for any revolver. One last note on work specific to a transfer bar action.

A transfer bar runs in a channel regardless of the exact design of the handgun. In revolvers with cast frames there is often a burr or rough spot in this channel. It takes a good light and magnification to discover these. A very thin file—even a nail file—with emery cloth wrapped around it will suffice. I have worked a Ruger GP100 with this technique recently. The results were very good, even surprising. The same works for the Ruger SP101. While these are rugged revolvers they are made by man and not perfect.

AG Far Without retraction of the firing pin a revolver with spent cases could not be opened.

MEASUREMENT & INSPECTION

Cartridge-based Headspace Gauge

A close look at how to make a custom Go headspace gauge from a cartridge—in this case using a 223 Remington cartridge.

BY NORMAN E. JOHNSON DECEMBER 2020

ORIGINAL PP. 17-18

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-E1F0282461-A2385-P17-F01. Know the rights holder? Please ask them to contact us.
AG-E1F0282461-A2385-P17-F01

Attention to detail must be observed in forming the headspace gauge from a cartridge, but basically it is an uncomplicated procedure. Begin with an new or fired case of the chosen cartridge—brand is not critical. Run the case through a body die or fulllength sizing die if fired. Leave the fired primer in place by removing the decapping pin if a full-length die is used. Be sure the primer is seated flush with the primer pocket. If using an new case, seat a used primer in the pocket.

Remove the entire case neck to the forward neck-shoulder datum line juncture. Be sure not to alter case dimensions while holding onto case. This should shorten the case length to 1.557 inches. The case should be clean and free of damage. Pictured here are both new and used cases of different brands. The fired and unfired cases can be cross referenced. use a medium grit grinding wheel for this and square it to-length at the exact neck-shoulder juncture. Remove any sharp edges from the case mouth.

Strengthening the Case I strengthened the case by using Brownells Steel-Bed to fill it. This material has the properties of steel with an extremely high crush or impact resistance. Just mix an amount to fill the cut off case, avoiding air bubbles, and allow it to set for at least 24 hours before using. Working the Headspace Gauge Ideally a “Go” headspace gauge will fit a newly reamed chamber with some feel of the bolt handle on closure and can be adjusted from there.

Here I shall expound on a test that I routinely use when forming an new chamber while using a Go gauge. I normally cut chambers so the bolt Far In so doing, be sure not to oversize the case by pushing the shoulder back, thereby shortening the datum line measurement. With the case neck removed, remaining case length will be 1.557 inches. Among the methods used to shorten the case, a common grinding wheel can be used. Then chamfer the case mouth inside and out.

CARTRIDGE-BASED HEADSPACE GAUGE 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-E1F0282461-A2385-P18-F01. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2385-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-E1F0282461-A2385-P18-F02. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2385-P18-F02

557. The entire datum line remains. Above center: The prepped 223 Rem case is ready to be filled with Brownells Steel-Bed which hardens like steel, totally resisting compression. Case is cut squarely on the datum line and filled with Brownells Steel-Bed. closes on a Go gauge with a feeling of some resistance. In so doing, most unfired factory cartridges will chamber freely.

If I have formed the chamber so the bolt closes with little or no resistance, I perform a further test by placing a circular piece of paper, about 0.004", between the bolt face and the case head. The bolt may not even close on this 0.004" shim. That's fine. I perform this test with anew, unfired case as anew chamber is headspaced, regardless of the Go headspace case finally used. I also perform the test when using a conventional Go headspace gauge.

The Sporting Arms and Ammunition Manufacturer's Institute (SAAMI.org) is actively involved in firearms industry stan-

dards and this information should be understood and followed. There are differing definitions of cartridge headspace, but in this context it is defined as a measurement from the bolt face to some point on the shoulder of a rimless case, commonly termed the datum line. In making my headspace gauge from a cartridge, all these important details were closely observed.

For example, headspace is considered excessive if there is more than 0.005" to 0.007" between the case head of a chambered cartridge with a fully locked bolt. Where headspace exceeds 0.020", case heads can actually separate resulting in a damaged or blown up gun. As a staff writer for Precision Shooting Magazine, I had authored a lengthy research article called "How Case Head Condition Affects Bullet Behavior" which appeared in the December 1997 Annual.

In this work I actually monitored bullet behavior as reloaded case heads would stretch to the point of separation on firing. Making a headspace gauge from a cartridge case is a very easy and practical way of getting the job done safely and effectively. Here we can actually make up a headspace gauge to fit our needs with common tools and materials at hand. We may even learn something in the process. AG Far 004" thick is used as a means of testing headspace.

Top 004" paper shim placed on the bolt face in preparation for testing headspace. If the bolt closed with the Go gauge in this test, I would consider it absolute maximum headspace. I normally prefer a light feel of the Go gauge as final headspace, allowing most brands of cartridges to chamber freely while not using the paper shim. The 223 Remington reamer pictured here is one of Dave Manson's finish reamers (Manson-Reamers.com, Dave makes some of the finest reamers on the market.

RIFLES

Case Turning Fixture

How to make a cartridge case turning fixture.

BY NORMAN E. JOHNSON DECEMBER 2020

ORIGINAL PP. 19

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-E1F0282461-A2386-P19-F01. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2386-P19-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-E1F0282461-A2386-P19-F02. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2386-P19-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-E1F0282461-A2386-P19-F03. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2386-P19-F03

Case rims, as used on some custom or wildcat cartridges, frequently require turning to fit the bolt face of a different rifle. Making a special fixture for this purpose is quite easily performed with a lathe and chambering reamer to fit the cartridge body taper. But it comes down to the gunsmith to get the job done.

Lathe Work For performing the in-line lathe work, the ideal body metal for making the rim turning fixture is a short section of barrel of same the caliber or around shaft large enough for an internal hole the size of the cartridge body being turned. With the rim turning fixture centered in a lathe chuck, use the proper cartridge reamer to form the chamber wall for the cartridge rims being

turned. It need not include the entire length of the case body taper as long as it fits the cartridge taper.

When turning new case rims to size, it is important to eliminate 0010 inch difference in diameter, thereby requiring the larger rim to be turned down to properly fit the bolt face. It is necessary to advance the reamer beyond the case shoulder (datum line) for a good friction fit of the case while turning the rim. (Continued on page 21) The WSSM case rim measures 0.535 inches while the 7mm Rem Mag case measures 0.525 inches.

The larger case rim must be reduced in diameter to easily fit the smaller bolt face where a different bolt is used. the chamber shoulder,

thereby allowing the new case to be held by body taper friction short of shoulder datum line contact. The shoulder and neck section of the case rim turning fixture can be bored out to eliminate shoulder bump. In this way, cases are held by light friction as they are aligned and turned. This works perfectly for both fired and unfired cases.

As an adjunct to body taper friction, I used a tapped brass screw through the body of the fixture as a means of contacting the web area of the case while turning. Contact of the screw is very light to avoid distortion of case. Turning Case Rims Cases can be precision turned, with the fixture precisely centered in the lathe, in less than 15 seconds as a

CASE TURNING FIXTURE CONTINUED

ORIGINAL PAGE 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-E1F0282461-A2386-P21-F01. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2386-P21-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-E1F0282461-A2386-P21-F02. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2386-P21-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-E1F0282461-A2386-P21-F03. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2386-P21-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-E1F0282461-A2386-P21-F04. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2386-P21-F04

sharp, pre-set tool bit is advanced by the lathe carriage. It is best to use a carriage stop to avoid lathe bit contact with the case body as the rim cut is being completed. Be careful as the tool bit is being set to proper depth to turn the rims down. A cleanup is all that is normally required. A good example of a need for turning case rims down is when re-barreling for the Winchester Super Short Magnum cartridges.

The rim on these cases measures 0.535 inch, whereas standard case rim diameter on the 7mm and 300 Winchester Magnums is 0.525 inch. Bolt face for these cartridges are often a snug fit, causing sticky chambering and extraction. This is particularly true where the case rim is enclosed within the bolt face on bolts like the 700 Remington, et al.

Conclusions There is no tool or fixture

specifically for reducing case rim diameter currently being made. This easy-to-make tool does an excellent job and the cost is minimal.

The gunsmith shop is the best place to get the work done at a very modest cost. AG Far The lathe tool bit is seen in close proximity to the case rim, ready for turning. Cases can be removed with a screw-driver or padded pliers.

SHOTGUNS

Modifying Gun Screws

How to modify a screw to fit your project's needs.

BY NORMAN E. JOHNSON DECEMBER 2020

ORIGINAL PP. 20-21

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-E1F0282461-A2387-P20-F01. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2387-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-E1F0282461-A2387-P20-F02. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2387-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-E1F0282461-A2387-P20-F03. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2387-P20-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-E1F0282461-A2387-P20-F04. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2387-P20-F04

We should not throw a gun away or quit using it simply because a part isn't readily available. A good gunsmith can make the part, although doing so might become a lost art. When a customer came to my shop in dire need of a special screw for his old Model 500 Mossberg shotgun, he had that "I really need help" look in his eye. The missing screw that retained the ejector was gone and he needed the gun repaired for the shotgun deer season only two days away.

With no time to get a replacement screw, I suggested I might make one if the thread size was that which I had a screw for. This really excited him to stick around and I'd see what I could do. The needed screw here is sandwiched between the bolt and the 143 inch and head thickness of 0.055 inch. A perfect duplicate of the missing screw for the Model 500 Mossberg shotgun. 143 inch length for a flush fit with the outside of the shotgun receiver. 055 inch.

This thickness permits the bolt to slide over the flattened screw. receiver with passage through the threaded receiver wall. The head thickness couldn't be much over 0.050 inch with a thread length of 0.143 inch. The thread pitch was 8-32 with about 0.310 inch head diameter. So I got right onto the job of making up the needed screw as the customer watched me. I first put an over-length, fully threaded, round-head steel screw

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-E1F0282461-A2387-P21-F01. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2387-P21-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-E1F0282461-A2387-P21-F02. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2387-P21-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-E1F0282461-A2387-P21-F03. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2387-P21-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-E1F0282461-A2387-P21-F04. Know the rights holder? Please ask them to contact us.

AG-E1F0282461-A2387-P21-F04

Total time to make the screw was under 30 minutes. in the lathe chuck and turned the head down to a thickness of 0.055 inch. This completely removed the screw slot to a nice, clean, flat surface. I then slotted the screw using anew fine-toothed hacksaw blade with the slot just short of cutting through the flat head. This all went very well and took only about 15 minutes.

I then turned the screw into the receiver with the ejector in place and used a vernier caliper to measure the amount of screw length that needed cutting. The screw was cut off and buffed down smoothly. I tried the screw, which fit perfectly, and buffed the end that shows through the receiver. With the prep work done, I dipped it into some Formula

44/40 Instant Gun Blue. Lapsed time was under a half hour. The bolt slid by the new screw smoothly and with plenty clearance.

Conclusions There is a lot of satisfaction in making gun parts that may not be readily available. Making a specific screw could put a hunter back into the woods without delay.

AG

PISTOLS

Reader Forum

BY AMERICAN GUNSMITH EDITORS DECEMBER 2020

ORIGINAL PP. 23-24

What connection, if any, did Hopkins & Allen have with Webley? Does the Webley being presumably manufactured in England represent a better grade of metal than used on the H&A revolvers? Is it metallurgically safe to fire? Steve Weedman Brian Smith responds. The content of the Hopkins & Allen series of articles in American Gunsmith pertains solely to H&A revolvers. If I've led anyone to believe that H&A and Webley were somehow related, that's not the case and I apologize.

Comparison of H&A revolvers with Webley revolvers is like comparing apples and avocados; there is no comparison. The only similarity between H&A and Webley revolvers is the top break design. As the H&A articles stated, Hopkins & Allen revolvers were fabricated using cast iron frames and were designed to be fired with black powder ammunition.

Because of the questionable process control and the fact that any surviving H&A revolver has an unknown history, it is strongly recommended that H&A revolvers not be fired at all. Webley revolvers were much better made, but most of those chambered in 455 Webley were made in an era when process control was nowhere near what it was in the latter half of the 20th century, let alone today. You mention that your Mark V, apparently manufactured in 1915, was converted from 455 Webley to 45 ACP.

This was a dangerous practice, and Webley revolvers chambered in 45 ACP have been known to fail catastrophically when firing 45 ACP ammunition. The 455 Webley cartridge has a pressure limit of about 13,000

PSI and under, depending on the Mark. "Six Tons" is generally stamped on proofed Webleys, and that means six long tons, or 13,200 psi, where along ton is 2,200 pounds of force. In contrast, the 45 ACP cartridge has a pressure of 19,000 psi.

In effect, every time a Webley is fired with 45 ACP factory loads, it's being proof tested! Don't do it! It is widely recommended in Internet message boards to handload for the Webley converted to 45 ACP by using preferably 45 Auto Rim cases, a 260-265 grain cast lead bullet (contact Buffalo Arms—BuffaloArms.com, Westport, KY and from 4.6 to 4.9 grains of Unique powder. Alternatively, 4.0 grains of Trail Boss can be used.

These loads are reportedly below the 13,200 PSI limit of the Webley Mk VI, given what is reported in message boards regarding loading and shooting Webley revolvers, particularly those converted to 45 ACP. Personally, I have an ACPconverted Webley Mk 5 and have shot it for more than 25 years using a 262 grain cast bullet sized to 0.455" and loaded with 4.8 grains of Unique in Remington 45 Auto Rim cases. The loads are extremely mild and surprisingly accurate.

I use the same load in Fiocchi 455 Webley cases in my uncut Webley Mk VI revolvers. Remington Rolling Block No. 1 I have a Remington Rolling Block No. 1 in the shop brought in by a customer wanting to determine the chambering. The rifle was handed down to him through the family. No one remembers shooting it and now he wants to. The barrel is marked "CAL 7mm" and my 7mm

READER FORUM CONTINUED

ORIGINAL PAGE 24

range rod goes in and fits really well with the stock bushing, however, it is not chambered in 7mm Mauser as it wouldn't close on that dummy round. I did a chamber cast but the dimensions do not match any cartridge I'm aware of. The measurements are base 0.470, shoulder 0.436, neck 0.330, and case length of 2.27+ to the end of the chamber. Brian Perkins Perkins Gunsmithing From Mark Hollensen. Based on the measurements provided, it could very well be a 7x57 Mauser but not a 7mm Mauser.

These are different cartridges and the 7x57 is a tad shorter in chamber length. Try looking up that round (it is in Cartridges of the World) and take a few more measurements from the casting to see if the base to start of shoulder, base to end of shoulder, base to end of neck, and the like match the specs for the 7x57. That might be your actual caliber. From Paul Mazan. This seems like a 7x57 Mauser in a 1902 Remington Rolling Block.

Unfortunately, currently available 7x57 Mauser cartridges are made to a standard that was agreed upon in the 1920s and, as you have discovered, the two are not compatible. If the firearm is to be shot, ammunition will have to be made by an experienced reloader that is familiar with making cartridge conversions. The base measurement of your casting is 0.470. That is slightly undersized as 0.473 is the current standard.

Your neck diameter of 0.330 is oversize as the current standard is 0.325, Your case length of 2.27 is longer than the current 2.244. It appears that the rounds won't chamber because the neck is too large in diameter to fit in the chamber. It would appear that properly fitting brass could be made using 30-06 brass as the parent cartridge. From RK Campbell. If I had seen the rifle I would have said 7x57mm Mauser, by far the most common, but this is not the 7mm Mauser.

While I'm not certain, the barrel markings do not seem period correct so it looks like this might be markings from a gunsmith job. I do know that Argentina—along with dozens of the world's armies— used the Remington rifle. Argentina replaced the Rolling Block and went to the Mauser bolt action in 7.65 Argentine. The original Remington rifles were in 43 Spanish.

I don't think it a stretch to imagine some of these rifles were rebarreled or even re-lined and chambered in 7.65mm Argentine, which according to specifications was shorter than the 7mm Mauser. I have seen quite a few conversions of old rifles that were very cheap at one time and they were rebarreled to modern cartridges.

Check for a neck diameter of 8.78 mm (0.346 inches), shoulder diameter of 10.90 mm (0.429), base diameter 12.01 mm (0.473), rim diameter 12.05 mm (0.474), rim thickness of 1.00 mm (0.039), case length of 53.60 mm (2.110), and overall length of 76.00 mm (2.992). Cold Bluing Many thanks to Glen Calvert for his article "Cold Bluing" in the July 2020 issue. I followed his advice and my results were fantastic. The polishing with 0000 steel wool really evens out the finish. Wish I'd of learned this trick 45+ years ago.

Brett Olin Sent from my Daystrom M-5 Reupping Tool Supply Wonderful article. I have a few Real Avid Tools and they are well made, however, when it comes to Driver Sets, take a good look at Chapman Mfg. Co. (ChapmanMfg.com, Their sets for gun owners and gunsmiths are exquisitely made, very functional, priced fair, and their customer service is top notch. I have been using them for years and have multiple units in different parts of my work area. Alan J Chwick Everything22andMore.com From author RK Campbell.

Thanks for reading! I've used Chapman tools for years and still have a few, I just like the new Real Avid tools a bit better. AG

SEARCHABLE ISSUE RECORD

Archive index

Sixty Years of Testing Guns American Gunsmith Editors	2	Cartridge-based Headspace Gauge Norman E. Johnson	17-18
Mauser HSc Mark R. Hollensen	3-8	Case Turning Fixture Norman E. Johnson	19
Linda Folding Stock Glen Calvert	9-12	Modifying Gun Screws Norman E. Johnson	20-21
Revolver Transfer Bars Robert K. Campbell	13-16	Reader Forum American Gunsmith Editors	23-24

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