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INSIDE THE ARCHIVE

THE WEATHERBY MARK V SWITCH BARREL

GUN LAW FAIL • CENTURY ARMS JW-2000 • .22 NOSLER • FORWARD THINKING FORWARD ASSIST

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 183

DIGITAL ARCHIVE EDITION

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FROM THE ARCHIVE

Gun Law Fail

BY AMERICAN GUNSMITH EDITORS MARCH 2019

ORIGINAL PP. 2

A study of firearm homicide and suicide rates in the 10 years after California simultaneously mandated comprehensive background checks (CBC) for nearly all firearm sales and a prohibition on gun purchase and possession via misdemeanor violence policies (MVP) found no change in the rates of either cause of death from firearms through 2000.

Gun Law Fail “California’s comprehensive background check and misdemeanor violence prohibition policies and firearm mortality” was published in the October 2018 *Annals of Epidemiology* and conducted by the Violence Prevention Research Program (VPRP) at UC Davis and the Johns Hopkins Bloomberg School of Public Health and compared firearm homicide and suicide rates in California over a decade following enactment of comprehensive background check and misdemeanor violence prohibition policies. “In the 10 years after policy implementation, firearm suicide rates were, on average, 10.9 percent lower in California than expected, but we observed a similar decrease in non-firearm suicide,” said Garen Wintemute, professor of emergency medicine and director of the Violence Prevention Research Program at UC Davis, senior author on the study.

The researchers included annual firearm and non-firearm mortality data for California and 32 control states for 1981-2000, with secondary analyses up to 2005. The study found no net difference between firearm-related homicide rates before and during the 10 years after policy implementation and that the enacted

background check and misdemeanor violence policies were not associated with changes in firearm homicides in California while changes in firearm suicides were similar to changes in nonfirearm suicides.

The null findings in California with these policies were found consistent with other recent background check evaluations. Results were robust across multiple model specifications and methods.

From the study’s Abstract, “In 1991, California implemented a law that mandated a background check for all firearm purchases with limited exceptions (comprehensive background check or CBC policy) and prohibited firearm purchase and possession for persons convicted within the past 10 years of certain violent crimes classified as misdemeanors (MVP policy).

We evaluated the population effect of the simultaneous implementation of CBC and MVP policies in California on firearm homicide and suicide.” Stated Conclusions and Results were, “CBC and MVP policies were not associated with changes in firearm suicide or homicide.” The study’s lead author was Alvaro Castillo-Carniglia, at the time a postdoctoral scholar at VPRP. Other authors include Magdalena Cerdá from the Violence Prevention Research Program at the University of California, Davis, School of Medicine; and Jon S.

Vernick, Daniel Webster and Cassandra Crifasi from the Center for Gun Policy and Research at Johns Hopkins Bloomberg School of Public Health. The authors and the journal reported there were no potential conflicts of interest relevant to the study.

HISTORY

Century Arms JW-2000

The Century Arms JW-2000 Coach Shotgun is a side-by-side double barrel with external hammers and an Old West look and feel. Here's how to improve it.

BY ED NUTTER MARCH 2019

ORIGINAL PP. 3-5

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The JW-2000 is a double-barrel shotgun imported by Century International Arms. It seems to be patterned after the Colt 1878 coach gun. Each barrel has a separate hammer. Chambers are three inches and the choke is cylinder bore. There is some debate online about what the stock is made from but it is described in the manual as “walnut stained hardwood.” A shotgun with hammers like this one has can’t fire if the hammer isn’t pulled back.

The JW-2000 also has a safety on the top that prevents the triggers from moving when it is engaged. While I like the looks of this gun overall, I was not pleased with the performance. There were Make sure this area is clean and free of debris so the extractor can

slide easily, a few needed tweaks to be made with the main issue being hulls sticking in the chamber. Some gunsmithing work and know-how set things right.

If you don’t have the manual for this gun (or any gun for that matter) the first thing to do is go online and search for a digital copy. Nowadays the chances are high that most manufacturers will have owner’s manuals freely available for download and/or that any number of firearm and gunsmith enthusiast sites will have an archive of such information available. Visit your preferred search engine and start looking. I used Google and searched for “JW- 2000 coach gun manual” to find a copy.

The JW-2000 has extractors instead of ejectors. When you break open the gun, the hulls are lifted up from the chamber for manual removal and they don’t go flying through the air. Sometimes, the hulls stick and don’t lift up very far. This can be caused by a few things, primarily a dirty and/or pitted chamber that can cause them to stick. The first and easiest thing to do, if possible, is to try a wide variety of ammunition with differing hulls. Some may function better than others.

If you find a shotshell that functions flawlessly, stock up on them. The problem arises when you run out, can’t buy them anymore, or maybe you just picked up the wrong bag. Then you’ll have to make do with what is available.

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A better solution is to have smooth, polished chambers that will function with just about any shotshell and hull type. Keep in mind, when you are polishing the chamber the goal is to make them cleaner, smoother, and brighter, but not necessarily bigger. Oversized chambers could cause the shotshell rim to stick in the chamber, light primer strikes from excessive headspace, or could cause the hull to rupture.

Should you encounter excessive headspace (hopefully not because you caused it...) Brownells sells the Clymer Shotgun Rim Cutter & Headspace Ring (#184-115-012WB) to remedy. Everything is at rest. Looking through older books, there are many recommended ways to polish the chambers. Some recommend using a brake cylinder

hone. Brownells sells the Lisle Corporation Shotgun Barrel Hone (#531-108-002WB) that is purpose built and looks quite similar.

The problem with an automotive wheel cylinder hone is that it isn't made to fit in smaller shotgun chambers. Such a hone may work in a 10 gauge or 12 gauge but would be too big for a 20, 16, or .410. One that has two stones may fit but one with three stones probably won't. Another recommended approach is to use a wooden dowel with notches cut into it, which is then wrapped with steel wool. This is turned with a hand drill and can be used to clean the entire barrel.

For a purpose-built solution Far along these lines, Brownells sells a Shotgun Barrel Polishing Flex Hone (#080-607-210WB) and special oil that must be used with it. It is

available with different grits and sizes for popular gauges. For the JW-2000, I decided to try 0000 steel wool wrapped around a cleaning brush. 0000 is the finest grade available and is used for buffing and polishing.

Other grades might be functional but would be too coarse (especially #3) and result in leaving scratches instead of a smooth surface. I used a cordless hand drill and a fairly low speed with silicone oil. If you are just polishing the chamber, a piece of masking tape can be placed around the cleaning rod to mark maximum depth so you don't go in too far and get into the forcing cone. After cleaning, the chambers appeared much brighter when viewed in the light. The next area I looked at was the shell extractor.

IT RIDES IN A GROOVE IN

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the receiver and pushes the shells out when the barrel is opened. It is an extractor only, meaning it just lifts the shell up; it is not an ejector which throws the hull free of the chamber. This area was thoroughly sprayed with cleaner and very lightly oiled. Since cold weather was approaching when this project was being worked, I used a dry lubricant which shouldn't leave a residue to congeal in the cold. Dry lubricant usually leaves graphite particles behind when it dries.

It can operate at a lower temperature and doesn't leave a residue that retains dust and dirt. As a useful example, another typical use of dry lubricant is as a lock de-icer. After setting the barrel aside, the next step was improving the firing mechanism. If you need to remove the stock, an 11/16" drag link socket fit this one with no side-to-side play. Using a

flat screwdriver, remove the screw at the rear of the trigger guard, pivot the trigger guard to the side, and lift up to remove it.

Two screws hold the right side plate to the left side plate. In order to ensure the right screw goes back in the right spot, I poke a hole in a sheet of paper and write or draw a picture of where it goes. I use that with most things I take apart. Sometimes I use paper, other times I use cardboard. Cardboard is better with greasy parts, especially like automotive parts, and is less likely to drop the screws out.

After removing the plates, I sprayed them with cleaner, let them dry, and applied some dry lubricant to the moving surfaces. I didn't have a problem with the trigger pull but some people online have taken these assemblies apart, polished any shiny wear spots, and reblued them before reassembly. If you

do so, the key is to make them smoother, not smaller. I didn't remove the firing pins but should you need to remove them use a flat screwdriver with a notch cut out of the middle to clear the pin.

This shotgun has the stock hammers on it. If you find those too small, you might try to scour the Cowboy Action forums to see if any are available. At one point, "Coyote Cap" (nickname for Master Gunsmith Martin J. Ahlman Sr., CoyoteCap.com, had some made. While it may not be suitable for hard use in Cowboy Action competitions, the JW-2000 has potential for home defense and most sporting applications suitable for aside-by-Far side shotgun. If you don't mind the weight, you could carry it in the field.

A little polishing makes it better. AG Far A screwdriver will have to be modified to fit this.

RIFLES

.22 Nosler

are the pros and cons of this new cartridge.

BY JOE CARLOS MARCH 2019

ORIGINAL PP. 6-10

The first I ever heard of the .22 Nosler was a very informative article by Aaron Carter in the July 2017 issue of American Rifleman. I suggest you review that article for greater detail because I have no intention of paraphrasing it. I will hit on a few areas where Mr. Carter and I are in disagreement, however. According to Carter's article, Nosler wanted to introduce anew round that would magazine feed in the Mouse Gun with a higher velocity than the old .223 Remington.

Supposedly, Nosler wanted the velocity of the new round to equal that of the .22-250, around not commonly used in Stoner-platform firearms. In order to achieve such a tall order, Nosler designed anew case that has the same length as the .223 Remington but is fatter, allowing it to hold more powder. This fatter case of the Nosler won't feed properly in regular AR-15 magazines so 6.8 mm SPC magazines must be substituted. I've had no feeding issues with the 6.8 magazines but they are pricey.

Since the 6.8 mags are also in use with the .224 Valkyrie (watch for an article soon) they are in high demand and can be hard to find. The new .22 Nosler cases have a rebated rim, meaning the rim diameter is smaller than the diameter of the case body just above the rim. Using this approach, a "regular" AR-15 bolt is used with no modification to the bolt face.

I used a similar approach when I selected the 6.5-284 cartridge to build long range AR-10 match rifles for the Army Reserve Shooting Team about two decades prior to invention of the .22 Nosler. The 6.5-284 also has a rebated rim that will fit an unmodified bolt face of an AR-10. I wrote about this earlier work with the larger Stoner chassis on pages 10-11 in "New AR-15 Products" (June 2018.) If you don't have a copy, send me an email to for the particulars.

Ever since shooters, gunsmiths, and reloaders got 90 grain bullets figured out for use in the .223 Remington, I seldom get shooters asking for a better long-range alternative in the Mouse Gun.

I do frequently get comments from competitors to the affect of, "I wish you smart guys would come up with a more wind resistant round that would magazine feed for 300 yard rapid fire strings." So, a year or two before the .22 Nosler came on the scene I had already been studying the specifications of hot 6mms and .22 center-fire alternatives that would work in the Mouse Gun. I was also looking at more windresistant .224 bullets that would work in the .223 Remington and standard AR-15 magazines.

I wanted around that would work with regular AR-15 bolts and that had factory brass available. Most of my customers do handload but not all of them have the

skills or the desire to make cases for wildcats so factory brass was a very favorable characteristic. I found enough desirable characteristics in the .22 Nosler to decide to include it in my 2018 line up.

It was my hope that the greater powder capacity of the Nosler would speed my 77 grain magazine-length bullets up enough to satisfy my customers' desire for greater 300 yard rapid fire wind resistance. Extra speed for the long- 22 Nosler was covered in the July 2017 issue of American Rifleman. seated 90s popular for 600 to 1,000 yard slow fire matches would be an added bonus. Chambers Obviously one of my first tasks was to design a reamer to meet my needs.

My whole philosophy regarding the .22 Nosler project can be summed up with my Rule One: Don't reinvent a bunch of wheels which we have already spent sweat and treasure developing for the .223 Remington! At the end of the day, we are just burning a little more powder (about 3 grains but work up carefully) to speed up the bullet about 150 feet per second.

A lot of shooters and gunsmiths, including myself, have decided that in the .223 Remington the Wylde chamber is about the best compromise for shooting a combination of magazine-length 77s for 200 and 300 yard events and then switching to 90 grain boat tails seated longer

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than magazine length for slow-fire matches from 600 to 1,000 yards. So, I simply loaded a 77 grain Sierra Match King to magazine length in a .22 Nosler case and packed it up and sent it out to Dave Kiff at Pacific Tool And Gauge (PacificToolAndGauge.com, I told him how much I wanted that bullet to jump before encountering the lands to match the jump of a 77 grain magazine-length round in a .223 Remington Wylde chamber. I did make a change in the leade angle from the normal 1 degree 15 minute Wylde angle.

Sierra came out with anew 95 grain Match King .224 VLD bullet January 2018. I had been experimenting with the new bullet in my .223 Rem. Wylde chambers with their more gradual 1 degree 15 min. leade angles and groups were horrible! Horrible! See my series, "Building The 90 Grain AR-15" (April-June 2014) for details. Other shooters that I've talked to who have tried the new heavy bullet reported fat groups with lots of fliers when fired in ARs with .223 Remington Wylde chambers.

I had never encountered problems with the Wylde chamber with any other bullet in decades of testing. Something I had read in the Sierra literature gave me the idea that angles in the new 95 grain bullet were designed to match a slightly steeper 1 degree 30 minute leade angle. So, in an effort to

try to get that bullet to shoot better groups I decided to try that leade angle in my .22 Nosler chamber.

I knew that the 0.600 ballistic coefficient of the new 95 grain bullet coupled with the increased velocity of the .22 Nosler would result in some very potent wind resistance if the bullet could be coaxed to shoot a decent group. Pacific has the blueprint for this reamer filed under my name and the number 46156. Or, if you request, I can email you a copy 56mm and 7.62mm casings that the AR-15 and AR-10 were designed for.

Far left is the .22 Nosler and on far right is the 6.5-284 that have rebated rims so they also fit stock AR bolts. of the details as a spreadsheet (Excel.xls format) file. Remember the chamber described above is a The front of the Sun Devil comes squared right from the factory. compromise. It will shoot magazine-length 77s well and will also shoot longer-than-magazine-length 90s or 95s well but it won't shoot either bullet optimally.

It would be a good chamber for folks wanting to shoot Match Rifles in Across The Course High Power competition. If your customer wants to shoot nothing but magazine-length ammo, I would seriously shorten the free bore so those bullets don't jump as far. On the other hand, if a person is going to shoot 100% ammo with long and heavy 90 and 95 grain bullets seated longer

than magazine length and never shoot any magazine-length ammo, a longer free bore would be best.

Just remember as you design a reamer, if all other things are held equal, the longer the starting freebore the earlier the barrel will shoot out. Barrels The next decision that all of us will have to make is the choice of barrel. Again, I invoked Rule One. I began with land height. Every bullet I have ever shot in the .223 Remington produced tighter groups in barrels with tall 0.218" lands as opposed to industry standard more shallow 0.219" lands.

So, I chose the tall 0.218" land which also results in higher round counts before shooting out. The downside of the tall land is increased pressure. It is easy to compensate for that by cutting the groove just 0.0005" deeper to 0.2245". There is no downside to the deeper groove. In fact, 90s seem to shoot tighter groups with the slightly deeper groove.

To combat barrel heating, I choose a 26" 5R single point cut rifled gain twist Bartlein barrel that has a beginning twist just in front of the chamber of 1:14" which increases progressively to 1:6.5" at the muzzle. While I used a 26" barrel in my first .22 Nosler, there has been a steady movement to longer 30" and even 32" barrels in the Mouse Gun. F-Class shooters seem to like the longer barrels

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because their guns are supported either on sand bags or on a bipod. If you are going to use such long and heavy barrels, I strongly suggest using a heavy wall receiver like the quality Sun Devil to better support your barrel. You will also want to adjust your beginning twist rate at the back of the barrel. For the 30", use a beginning twist of 1:21" in front of a 1.940" chamber. For the 32" barrel, begin at 1:23". Both should still end at 1:6.5" at the muzzle.

This is probably a good point to fulfill one of the promises I made at the beginning of the article. Mr. Carter experienced groups beginning to open up at about round 4 or 5 and that was in 53 degree ambient temperatures. Wow! I am not being critical of my fellow gun writer and realize he was just shooting what he had been given. I fired full tenround groups in a machine rest in temperatures over 80 degrees and watched every round impact downrange. I observed nothing unusual.

So, what were the differences between rifles? Mr. Carter's rifle had a stainless barrel that was button rifled. Button rifling induces a lot of stress in the barrel and if that is not properly and completely stress relieved later in the manufacturing process there is a good chance that the barrel will "walk" as it warms up.

Bullet impacts will start to move in relation to the point of aim outside the rest of the group and often continue to move further outside as the barrel warms up further while additional shots are fired. My obser-

vations having machine rest tested many hundreds of barrels is that "walkers" are more common with stainless barrels and the severity is also greater as compared to chrome moly steel barrels. Barrels rifled by the button method far more commonly walk than those rifled using the single point cut method.

Barrels that "walk" can sometimes be corrected by cryogenic treatments. Cryo is not a sure fix and it is expensive so smart hom-bres choose a barrel that is less likely to turn out to be a "walker." The best combination is a cut rifled chrome moly barrel. As any barrel is fired, it heats up. The barrel is made of some kind of steel but it is housed in an aluminum receiver which will react differently to heating. On top of that, most receivers are not square on the front.

When the barrel extension is slid into the receiver, the raised flange on the barrel extension will be stopped by the high spots on the front of the receiver. These high spots offer pivot points when the barrel is fired and can influence its harmonic whip. The fit of most barrel extensions to the receivers they live in is normally quite sloppy and allow up and down and left to right movement. I correct these problems by using quality Sun Devil upper receivers.

These arrive from the factory squared on the front and they have heavy walls just behind the barrel nut threads where nearly 2/3 of the barrel extension lives. I also match custom BAT Machine match barrel

extensions to my receivers for a tight press fit, eliminating the slop that you will find in factory guns.

The combination of using chrome moly barrels that were rifled using the single point cut method and then properly mounting in a quality Sun Devil receiver has virtually eliminated "walkers" in rifles I have built in any caliber. Two last pointers on barrel heating. Use a well-ventilated handguard. I like handguards from either JP Enterprises or Geissele Automatics. Regardless of caliber, never leave around in the chamber with the bolt closed and allow it to "cook".

A lot of shooters keep alog of each shot recording the location, score, and any sight changes. Don't put the next round in the chamber and don't close the bolt on it until after you are done with any record keeping and making sight changes based on the last shot. Wait until you are all done with the administrative chores and you are ready to fire the next shot before pushing the round up into the chamber and closing the bolt.

If, for some reason, you are delayed in firing around, consider pulling it out of the chamber and placing it last in your ammo queue. Select another cool round, chamber it, and fire as normal. Keep unfired ammo covered or shaded so it isn't heating up. I covered the topic of "cooking ammo" in greater detail in "Encyclopedic Error" (June 2017.) If you are unable to obtain a copy, email me at

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Load Info Moving on to loads, if you Google “.22 Nosler load data” you will end up on a Nosler website which lists bunches of loads. I looked at the 77 grain bullet data and found Reloder 15, which is a powder commonly used in the .223 Remington. Just as I would recommend to you, I began low and worked up while watching for signs of pressure. I found 27.5 grains chronographed at 3029 fps to be the most precise. Nosler lists 28.5 grains as maximum.

I tried 28.0 and found that to be pretty hot and less accurate than the halfgrain lighter load. Coincidentally, Nosler lists the charge weight that gave them the tightest groups for each powder during their testing. For Reloder 15 pushing 77 grain Hones to perform this are available from Brownells. Use the 0.243 hone for the .22 Nosler. 22 Nosler rims can be dressed down with a file.

Warning, if you take too much of the rim off the primer can seat above the case head, leading to slam fires! bullets they found 27.5 grains to be the best, just as I did. I don't know if Nosler and I would agree on any other powders as each gun has its own likes and dislikes. I briefly tried the Nosler 85 grain RDF (Reduced Drag Factor) bullet seated to magazine length and using the amount of powder recommended by Nosler.

In my tests I got the same fat groups that I experienced when I shot this bullet in the Wylde chambers of the .223 Remington. It appears to me that the 85 grain bullet will not shoot its best when it is jumped long distances. No surprise! I knew that the next bullet would be more of a challenge. Nosler does not make a 95 grain Very Low Drag bullet in 0.224" diameter and don't list load recommendations for them.

I noticed that with 77 grain bullets my final .22 Nosler charge weight was within about three grains more than in .223 Remington firearms. So, just as I would recommend to you, I worked up gradually to a charge of 27.0 grains of Vihtavuori N150 in the Nosler yielding 2,814 fps.

I got nice sub-minute ten-shot machine rest groups both by jamming the Sierra bullet (seating it longer than chamber length) or jumping it (seating it shorter than chamber length.) The next bullet I wanted to try was the increasingly-popular Sierra 90 grain Match King, which is a true boat tail. Since it is a boat tail I didn't experiment with jamming it the way I did with its heavier cousin, the 95 which is a VLD (according to Sierra.) Again, I got nice, tight, sub-minute ten-shot groups in the machine rest.

Charge weight ended up at 26.9 grains of VV N150 powder. Velocity was 2,837 fps., very similar to the 95. Brass If you recall part of my reason for trying the .22 Nosler was the fact that factory brass was avail-

able. That ended up being a mixed bag. Like many of you, I had heard a lot of bad-mouthing regarding the .22 Nosler brass. Claims of rips in the rims, brass flowing back into the ejector, failure to hold primers, etc. There are two general theories regarding these issues. One blames the rebated rim.

The idea is that because the rim is smaller than the body of the casing too much pressure is exerted on the case head. A couple of decades before the invention of the .22 Nosler I had tried another cartridge with a rebated rim in the AR-10 with the 6.5-284. I chose that cartridge in part for one of the same reasons I settled on the .22 Nosler: The case head would fit an unmodified AR-10 bolt face. That brass was made by Lapua and I had none of the problems reported above.

The other theory says that the Nosler brass is way too soft. I saw a lot of evidence of that. Obviously, a lot of this is related to how hot the owner is trying to run his ammo. Of the three loads I listed above, the one for the 95s were the hottest and gave the greatest problems. Torn rims were very common. In “Straight Bullets” (December 2018) I discussed this specifically. “Better Ammunition” (April 2016) and “Precision AR-15 Ammunition” (August 2016) also gave hints concerning ammunition.

SOME OF THESE DEFORMITIES CAN BE DRESSED DOWN BY SIMPLY PULLING IT OVER A

.22 NOSLER CONTINUED

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flat file though one has to be careful in performing this fix. If you get carried away you can end up taking enough brass off to the point where the primer will be sitting above the case head and slam fires can result. Make sure you are using a primer pocket cleaner each time before trying to insert anew primer. The problem with not dealing with torn rims is that when the bolt locks up any high spots on the rim will cause the whole cartridge to cock at an angle inside the generous dimensions of the chamber.

The bullet will never enter the back of the barrel on center with the bore and it will be deformed. Mr. Carter recommended full length sizing and even the use of a small base die. My contention is that full length sizing only permits the cartridge to cock even further in the chamber and make accuracy issues even worse. Instead, I relied on neck sizing with a shoulder bump and I never touched the side walls of my fired brass. Note, this was for single-fed long range shooting and not rapid-fire ammo.

This approach will better center bullets on the bore of any cartridge, including the .22 Nosler. When I was setting up my die I ran it down until the bottom of the die hit the top of the shell holder and backed off just a little. That resulted in only 0.0015" of shoulder bump. This is really on the light side of most recommendations which often call for 0.003" of bump but I decided to try it. As case rims got increasingly boogered up, this adjustment proved to be too light.

Early on, the cartridge shoulder would slam up against the shoulder of the chamber under the pressure of the buffer spring. This would allow the cartridge shoulder to be bumped back further. I was essentially using the gun to perform part of the sizing operation by allowing the bolt to lock up. After more firing the cartridge rims got so bad that the bolt would no longer lock up, requiring that I dress down the top of the shell holder.

That allowed the die to be screwed down more, resulting in increased shoulder bump. I ended up with just over 0.004" of bump which was very welcome regarding function. Please note that this shoulder bump issue could just as easily have happened had I been using a full length sizing die as both types of dies adjust shoulder bump by screwing up (for less bump) or down (for more bump). I also had issues with primer retention.

Starting with my first reloading, I could easily feel much less resistance to seating replacement primers as compared to the resistance I felt when the brass was brand new. By the fifth loading the combination of primers that wouldn't even stay in their pockets plus the torn rim issues caused me to throw the brass right in the trash. I mentioned above that others have reported issues with the Nosler brass and the ejector.

I fired about 200 total rounds with barrel break in and load development work and had about a half dozen instances where the soft brass flowed back into the cavity in the bolt face where the ejector lives. The bolt would end up locked back with the fired casing still sticking on the face. Usually I could just use my index finger to sweep the casing out. Once it was stuck so bad that I had to go in with a screw driver, however. This always happened when I was running hot ammo.

I discuss the prevention of bent rims in "Straight Bullets" (December 2018.) To further help, I suggest gunsmiths polish all chambers to make extraction easier. Learn how to polish chambers in "AR-15 Chamber Selection, Part Three" (September 2014.) I also suggest that brass needs to be tumbled each time it is fired to keep it slick and easier to extract. Finally, locate the gas port two inches forward of normal.

This increases dwell time so the bolt stays locked up longer, allowing more of the gas pressure to subside and making extraction

easier. Don't get carried away with powder charges. I could see big differences in the rim conditions of brass that had been fired with moderate charges as opposed to those where higher powder charges were loaded. Unfortunately, how much powder we use is not entirely our call. The gun itself has the majority vote in this.

The gun knows how much powder it wants and if we insist on cutting that down I usually see groups open up. The same thing happens when we go over the amount of powder the gun wants. So, if we have to cut powder charges below what the gun wants to get longer brass life, the cost may well be fatter groups. In conclusion, the .22 Nosler achieved my goals.

Speeding up the 77 grain magazine-length bullets results in that bullet equaling the wind resistance of an 80 grain bullet seated longer than magazine length in the .223 Remington. The 95 grain Sierra VLD in the .22 Nosler pretty much equals long range ammo loaded for the current flavor of the month, the 6.5 Creedmoor. Note that the 6.5 Creedmoor requires the larger frame of the AR-10. The .22 Nosler achieves this ballistic excellence in the Mouse Gun, which I think my customers will view favorably.

The unfortunate cost of this performance is short brass life. I used all of the tips listed above as each gun will react differently. I found a video or a picture of a guy on the Internet saying he was getting ten firings out of his Nosler brass and he showed a picture to prove it. So, my advice is to follow the tips I listed above and watch both your rims and your groups. When the rims get too funky groups will open up and fliers will increase, calling for that brass to be discarded.

Think of it as just the cost of doing business. Do you want high scores or long brass life? If you can't get both, which will you choose? AG

FINISHING

Forward Thinking Forward Assist

Ever consider the AR-15 forward assist as a decorative piece? Options are few but this small addition will surely grab the attention of fellow shooters at the line.

BY ROBERT COLES MARCH 2019

ORIGINAL PP. 11-12

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With the AR-15 ejection port cover receiving all the attention of decoration these days with laser cut engravings and flashy logos, the forward assist found on most AR-15 upper receivers serves a lowly function and is seldom thought of as an item to accessorize. I began searching the web for alternative style forward assist buttons and the selection was very limited.

I then decided to experiment with different ball mill cuts on the as-300 Blackout cartridge with AR-15 forward assist assembly. I found a button head, only to find it remained plain looking. As a decorative item, the forward assist needs something to make it stand out.

Looking for inspiration, I had an AR-15 upper barreled in .300 Blackout and rifled with a 1:7 twist for subsonic work sitting on the bench with several pieces of spent brass with Hornady 300 BLK headstamps.

As I collected the brass up for the tumbler, I thought, "Why not inlay the case head in the forward assist face?" I ordered some forward assist assemblies from Brownells (#078-101-143) which came complete with spring and roll pin. Once the forward assist was chucked in the lathe, I squared a cutter to the face and started removing material for the diameter of the case head (0.475+) for a snug fit. Cutting to a depth of 0.1535" allowed for added

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epoxy to be applied later. A word of caution here: When cutting a depth any deeper than 0.1535" on this part it will separate the tapered rim of the forward assist button from the stem. Don't ask how I know... Next is the task of a clean-cut case head. Brass is solid in this area except for the flash hole. I converted .223/5.56 brass to .300 Blackout with a Drill Master #62136 Two-Inch Mini Bench Top Cut-Off Saw.

A jig that is used to cut the .223/556 brass at the case shoulder worked perfect when I installed the .223/5.56 case backwards and produced a cleancut case head button ready for the inlay. Cleaning up the cut edge with a small file eliminated any burs that might have prevented the brass head from a flat seated fit. Considering the growing populari-

ty of the AR-15 platform, nearly any case head can be used as AR-15s can be chambered for numerous cartridges.

This will make for a unique and quick reference to the chambering of the specific upper. Some case headstamps are hard to read so now is the time to highlight that headstamp and make it stand out! It's simple enough to do with a black Sharpie marker. Just blot the headstamp until filled, let dry, and buff the high spots with #0000 steel wool. A bright shiny brass case head will be highlighted with bold, black, and easy-to-read cartridge information.

Indexing the forward assist is routine and a small piece of tape will help as a referencing marking the top center while inserting the case head for a proper 12 o'clock alignment.

Any epoxy of your choosing can be used here. I worked with J-B Weld since it was already on the bench and an easy choice. The fitting you should have done beforehand will have produced a flush fit of the case head into the forward assist button face. Once set, let it cure overnight. You can leave it oxide black as most are.

Another option that I like is to paint with Aluma-Hyde II (Brownells #083-002-412) in stainless steel gray. Conclusion With all the personalization customers want on AR platform rifles, this is a unique look that isn't readily available as an aftermarket option and will make any rifle stand out. One thing I can guarantee is after the modification to the forward assist it will receive much more thumb time than ever before! AG

PEOPLE & COMPANIES

Tuning A Surplus FN Hi Power

The predecessor to “wondernine” and polymer pistols, Browning’s Hi Power is a potent classic.

BY ROBERT KOLESAR MARCH 2019

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John Browning’s second great pistol, the Hi Power (second to the 1911, of course) was recently discontinued by Fabrique Nationale in Belgium. Tooling and machinery were wearing out, production costs were rising, and military orders were slowing down. The rise of the plastic handgun was eclipsing what was once the gold-standard of 9mm service pistols.

Cheaper and easier to produce, polymer-framed handguns like the Glock and the new SIG M17 have been replacing the onceubiquitous Browning on the hips of military and

police world-wide. There’s an upside to what many would consider a sad end of an era. Lots of Hi Powers are on the surplus market and most are in good functional condition. Finish-challenged maybe, but with minty internals. Duty weapons aren’t shot much.

They might be carried daily, dropped a lot, only cleaned occasionally, and stored improperly (causing surface rust), but refinishing will cure that. Parts will. This BHP is a German police contracted pistol that probably sat in a drawer for most of its career. Only issue with the older post-war guns made up

to 1964 was the internal extractor... if it breaks, anew one is hard to find and must be properly fitted.

Best to find a more recent pistol with an external extractor for extensive shooting, sometimes be mismatched due to military rebuild programs. The basic pistol, though, is a keeper. A few upgrades and you have a superb shooter or a rugged defensive piece. While not a first-line duty pistol for many armies now, the Browning Hi Power is just too good. All you need and nothing more. This one was made for the Austrian Border Police.

TUNING A SURPLUS FN HI POWER CONTINUED

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Far It'll get Novak fixed sights, a fivepound trigger job, left-handed safety, and a Cerakote refinish. The original plastic stocks, which are thin, rugged, and comfortable, will stay. Top BHP is a "Capitan", reintroduced in the 1980s. It has the old, pre-war ladder sights, adjustable out to an optimistic 1500 meters. Middle is a commercial Belgian 9mm from 1974 with the newly introduced spur hammer. Bottom pistol is a 1987 MK II with a forged frame and the new ambidextrous safety.

It has a tough Parkerized finish and better, fixed sights than the older BHPs. to die. It soldiers on as an excellent choice for U. S. civilians to shoot and carry. Buying a surplus Browning can be a fun experience as there's lots of them for sale on the Internet. I recently bought a nice MK III Israeli contract 9mm that will eventually become a customized

range and carry gun. The finish is a sprayedon epoxy black paint but the pistol itself is in great shape internally, with a mint barrel and bore.

A Little History John Browning started work on the Hi Power (called the "Grande Puissance" P35 or "Hi Power" in Europe) after WWI in response to a French Army request for anew service pistol. Browning died before finishing the design. Dieudonne Saive of Fabrique National (FN), who had been working with John Browning on the pistol before his death, finished work on the new single-action pistol, which incorporated a 13-round magazine, magazine safety, and a fixed barrel bushing.

Belgium was the first to adopt the Hi Power in 1935. Top is a 1974 FN Belgian BHP 9mm High Power, made when the BHPs were at

the zenith in quality, fit, and finish. Bottom is a Glock 22 in .40 caliber, probably the most issued police pistol in America. Made of modern polymers, ugly, and cheap to produce, it's a favorite now because of the low cost and ease of manufacture. The new P35 went on to be issued by some 57 countries, including most of NATO, as their standard military sidearm.

During the last 80+ years, the P35 Hi Power has undergone a few changes, including switching to an external extractor, different calibers (7.65mm and .40 S&W) and Israeli Army surplus pistol. It was re-Parkerized, magazine safety removed, and the rear sight opened up slightly. A newer drop-in stainless barrel from Rem Sport helps tighten the groups somewhat with match GI ball.

TUNING A SURPLUS FN HI POWER CONTINUED

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Far This one is riding in a lefthanded Israeli inside waistband holster. Israeli guns are typically carried chamber empty, hammer down (Condition 3), adding both cast and alloy frames to production. Basically it's the same pistol though; throughout its service it has racked up an impressive record of reliability in combat. It is one of the premier military pistols of the 20th century. Shooting a Browning Hi Power is like having apiece of military history in your hand. Every hardcore pistol shooter should have one.

Upgrading Because the Hi Power has been so popular for more than seven decades, lots of parts are available. Not just surplus parts, but new, commercially-made components that'll make your pistol perform better than as-issued. Remember though, the priority here is easy-to-see sights, reliability and a clean-breaking trigger. Everything else is not really necessary, it just depends on how far

you want to go and what your pocketbook will tolerate. I like to keep my improvements minimal.

It's cheaper and gets Perfectly done by Arnie Dew. Far Very quick and simple takedown for cleaning is one of the BHP's best features. the gunsmithing work done quicker. I have a '67 T-series that has had the magazine safety removed, rear sight notch opened up slightly and then given anew Parkerized finish. It's fun to shoot, totally reliable, didn't costa lot, and looks good, in a very business-like way. Before spending money on any Browning, do a little research.

I'd stay away from the pre-war, wartime or early postwar guns... unless you're a collector. The later, post '64 guns have an external extractor that's more rugged, easier to replace, and doesn't need fitting. Anew extractor spring is probably all you'll need to add. Browning/FN started phasing out the internal extractors in 1962 so there's a transition

period where you could find either one on a BHP. Probably the best gun for shooting is a surplus MK III.

These have cast frames (early MK IIIs had forged frames), excellent sights and, if they're from a military contract run, no firing pin safety. Cast-frame MK III guns started appearing in 1990 and can be ID'd by looking inside the magazine well and finding a casting mark (which looks like a letter or numeral) on the upper right inner side of the magazine well. Cast frames are stronger and much more durable for extended shooting.

Supposedly there is a different "feel" to a cast frame in comparison to an earlier forged one but I haven't been able to detect the difference. Cast frames were initially introduced by FN to handle the higher pressures of the .40 caliber and were then later used in the 9mm to simplify manufacture. Cast frame 9mm BHPs can handle the increased pressure of +P ammo.

TUNING A SURPLUS FN HI POWER CONTINUED

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Tiny, V-shaped notch was opened up slightly by Arnie Dew. Not the best rear sight for range work, but it'll do. This is one of the more popular rear sights available for a BHP and would be the author's choice for a range or carry pistol. A great concealed-carry sight, because it's very small and the edges are rounded, with the option of tritium for night work. While a 9mm Hi Power makes for a superb range gun, it'll never win a bullseye match.

Not designed for target work, it instead makes for a great concealed carry piece or a Saturday afternoon shooter. I've seen some BHPs that have had the slide tightened to the frame, barrel lugs snugly fitted to the slide, and a tight, removable bushing added, but the accuracy improvement was negligible. Best to get a tuned 1911 Later MK II and Mk III barrels have no "hump" on the feed ramp. The straight-line feed on the later MK IIs and MK IIIs will feed hollowpoints without modification.

Gunsmiths usually remove the hump on older guns like the T-series to assist in feeding hollowpoint ammunition. Best to shoot the pistol first though, as an older gun may feed modern hollowpoints fine, without any changes. A nice-to-have addition that enhances the accuracy of your Browning if your barrel is worn or pitted.

A BHP with a properly-fitted factory barrel in good shape will almost always group quite well though, so test your pistol with several loads first before buying an expensive replacement. If you want extreme accuracy or a match gun. Good sights are definitely worthwhile if you want to get the most from your Browning. The later MK IIs and MK IIIs have good, easy-to-see fixed sights. Better yet would be having the slide milled for a set of Novak fixed sights. These are low-profile with an excellent sight picture.

I prefer the Novaks simply because I've used them on several pistols and like them. You can send the slide to Novak, have your choice of sights fitted, and have your slide back on your pistol in less than a couple of weeks. Usually the slide doesn't need to be refinished. The trigger on a Hi Power can't compete with a 1911 due to the long reset and the complicated linkage.

Removing the magazine safety helps, along with a lighter 26 or 28 pound hammer spring (most Hi Powers have a 32 pound spring to ignite hard primers) and some VERY slight stoning of the hammer and sear. A good Hi Power 'smith will keep the pull weight above five pounds for safety and reliability. Mess with the sear/hammer engagement too much and you'll experience hammer follow. Cylinder & Slide makes hardened tool-steel hammers and sears that are a great addition if you want to spend a little more.

Not really necessary, but something to consider if you're planning a full-on custom project. Don't forget to check and replace your springs. Most surplus pistols will still have all the original springs inside. I use original 17 pound-weight recoil springs and they work well in tandem with a 26 or 28 pound hammer spring. BH Spring Solutions produces a complete spring kit that makes respringing an easy task. They also sell a tool that makes removing and replacing the hammer spring a snap.

It's cheap and should be in every BHP owner's tool kit. Also check and replace the extractor spring if you have an external extractor gun. A BH Spring Solutions kit will take care of that, too. Another upgrade that might be worthwhile is a new barrel. Rem Sport makes a beautifully machined one-piece stainless drop-in that has a straightened feedramp for feeding hollowpoints plus a nicely done muzzle crown. The barrel I bought fits well, has functioned re-

TUNING A SURPLUS FN HI POWER CONTINUED

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Far It has the cast frame (cast frames are stronger, which is a good thing if you intend to shoot a lot) and no firing pin safety that the American-import commercial pistols have. Ugly epoxy paint finish that is a perfect candidate for a Cerakote-type redo. It's always a good idea (and cheaper) to test your new pistol extensively before sending it off for custom work. liably in three BHPs, and could be considered a true "drop in" with no extra fitting needed.

Bar-Sto also makes a nice stainless barrel, but it comes oversized and will need to be fitted. Bar-Sto barrels have a stellar reputation for accuracy with jacketed ammunition. Last up is refinishing. Again, not really needed if you like the rough military finish on most of the Israeli pistols but a properly refinished Hi Power is a thing of beauty. I don't care for a high-polish blue on my working pistols; Parkerizing or black Cerakote is durable and looks great. It's also cheaper.

The secret to a good refinish is in the prep work (polishing) before applying the finish. Keeping the edges straight and not overbuff-

ing makes for a good-looking This group was shot at 20 yards offhand, with GI match ball. Gun is an early 70s (1974) BHP. Spur hammers on newer BHPs (early 1970s forpistol. Most of the Israeli guns I've seen have a flat-black epoxy paint that looks pretty sad. The pistol underneath will probably be in good shape, though.

My MK III had no bruises, dents, or dings that needed to be filed or buffed out. A good soaking for a day or two in Jasco Paint & Epoxy Remover will get that painted finish off. Follow up with a bead blast and you should be good to go with a smooth, professional-looking surface preparation before applying the finish. Shooting Range time with a Browning can be initially frustrating if you haven't ward) also help a lot. A high grip combined with fat paws can be painful. shot one before.

Triggers on most BHP "as-issued" pistols tend to be heavy (6-12 lbs.) with lots of creep. That can be improved, but don't expect a 3.5 pound 1911 match trigger. Sights on the older guns tend to be an afterthought,

with a tiny V-notch rear and a thin blade front. A little work with a small file makes the rear sight easier to use, if you're not into installing after-market sights.

Remove the magazine safety (very easy), open up the rear sight notch if you have an older gun, replace your springs, and you should be ready for your first range day. Determine how your gun shoots first before doing any extensive gunsmithing. This is the time to see if your issued barrel groups well. Check the crown for any chips or dings that could open up your groups. Are-crown of the muzzle is cheaper than anew barrel and is always a good idea.

Check the lockup and make sure your barrel lugs mate snugly into the slide. Some movement is necessary but you don't want your barrel rattling around when in-battery. Shoot the pistol for point of aim and accuracy (20 yards works well) and note what kind of malfunctions (if any) there are. Hiccups can usually be traced to (Continued on page 23)

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worn magazines (Mec-Gar makes a good and inexpensive aftermarket magazine), a worn extractor spring, shooting a dry gun, or using hollowpoints in an older pistol with a humped feedramp. Straightening and polishing the feedramp is an easy fix. Hi Powers aren't too finicky on ammo but like all pistols yours will probably show a preference. Best ammo I've used accuracy-wise is Atlanta Arms 115 grain jacketed match ball, which is issued by the Army Marksmanship Unit for use in their tuned Berettas.

Try sev- Sources Cylinder & Slide Cylinder-Slide.com, BH Spring Solutions BHSpringSolutions.com, The Action Works TheActionWorks.com, Rem Sport/TR Enabling TR-Enabling.com, Novak's NovakSights.com, Mec-Gar Mec-Gar.com, eral different brands and weights in assessing your pistol's potential accuracy. This will be an on-going process and might take more than a couple range sessions.

I've found that most issue FN Hi Powers with a good bore and a clean, undamaged crown will easily group into two-inches at 20 yards from a rest. That's excellent accuracy for everything but the Nationals at Camp Perry. A reliable handgun that groups well is a beautiful thing and just about any Hi Power should easily do that with a little tweaking. Add a few custom touches and you'll have one awesome pistola. Gotta love a Browning Hi Power! AG These rates are good in U. S. and Canada only.

For all other countries, annual dues are \$60 payable in U. S. funds. 3. To Give a Gift Subscription Enter your name and address above (in Section 1) and your giftee's name and address below. The subscription rates stated above apply to gifts. Name Street City State Zip

RIFLES

The Weatherby Mark V Switch Barrel

The adaptability of a switch-barrel rifle can serve a shooter's needs in many ways and for less cost than having a rifle for each chambering.

BY NORMAN E. JOHNSON MARCH 2019

ORIGINAL PP. 18-23

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Not all rifles are readily alterable to switch-barrel use but those that are can offer the shooter a wide range of shooting performance. As a practical switch-barrel application the set-up should be easy to work with, safe, not overly expensive to make up, and fully as accurate, or better, than the unaltered parent rifle. Where this is attained, it will likely set the stage for some interesting and enjoyable shooting.

Over an extended period spanning a couple decades, I have converted a good number of different types of rifles to switch-barrel use. This has involved more than 140 barrels and a variety of action types, chamberings, stocks, triggers, and sighting equipment.

Among those actions I have worked with are the post-1964 Model 70 Winchester, 40X Remington, Remington XP-100, Model 700 Remington series, Savage M12 series, Stevens single barrel, Thompson/Center TCR 83, Ruger M77, and more recently, the Weatherby Mark V action as used for standard cartridges. The Weatherby Mark V is somewhat lighter

version of the legendary Weatherby Mark V Magnum action and the topic for this article. The bolt has six locking lugs as compared to nine on the Magnum action.

Both, however, feature a 54-degree bolt lift, one of the shortest of any production rifle on the market. This Weatherby action, as used on the Super Varmint Master rifle, is a From top, a Weatherby factory stock; receiver and trigger with bolt, trigger guard and special action wrench. Third row, a Manson .243 reamer, Clymer .257 Improved reamer, Manson .22 PPC reamer, and reamer wrench.

Barrels from above area .22 PPC 1-7 twist Broughton, .22-250 Remington 1-14 twist Criterion, .257 Improved 1-10 twist Broughton, .243 Winchester 1-10 twist Criterion; Sightron SIII 45X Target scope with Talley Picatinny mounting system. single shot and is very strong. It has a single stage trigger that is fully adjustable to a safe, crisp pull which should be performed by someone experienced in this area.

While not getting too immersed in detail, my definition of an uncomplicated, easy-to-use, switch-barrel rifle means just that. In the process of switching barrels, the scoped action remains totally undisturbed in the stock. That is to say, the barrel is removed from the action without loosening the action screws or touching the scope. The barrel is taken from beneath the scope directly through the barrel channel which is often enlarged to accommodate larger target and varmint barrels.

A special action wrench must be used to go about switching barrels while leaving the scoped action in the stock. Where no such wrench is commercially available, it can usually be made with common machine shop tools. This was the case with the Weatherby Mark V single shot action with its unique six locking lug system. As is often the case, if I can't find a tool to do a job, I go to the drawing board and trust my visionary instincts to guide me. The Weatherby action presented a typical example of such a need.

WITH ITS THREE PAIRS

THE WEATHERBY MARK V SWITCH BARREL CONTINUED

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of unevenly positioned locking lugs, the Mark V action wrench was quite different from other action wrenches I have made. Mark V Action Wrench The action wrench was made from a semi-hardened length of rod stock and turned to fit the rifle bolt hole with sufficient length to engage the inner locking lugs and extend out within reach of the torque adapter coupling. As a pattern, I turned a wood dowel to this same diameter to get an exact impression of the unevenly spaced internal lugs.

From this pattern I marked and machined the head of the action wrench to fit the internal action lugs. I used a center cutting ball end mill to form three grooves on the end of the wrench to precisely match those of the internal action locking lugs. I then cut the action wrench to length and formed the end to fit a half-inch socket wrench drive. The socket wrench, when in place, extended just short of the front of the stock comb while avoiding contact with it.

At this juncture the main torque bar is attached using a half-inch-drive socket wrench with square drive on one end and a half-inch eight-point socket at the other. The special head of the action wrench engages the internal locking lugs and extends to a point just beyond the action tang. Here the heavy duty torque bar unites with the action wrench via the aforementioned socket wrench. From this position—with the barrel held in a special padded vise—the required torque can be manually applied to the action.

The barrel can then be easily removed or installed. Setting Up Switch Barrels Here I will provide the fundamental information on barrel installation and removal as applied to Far Shown here is the open stock with the receiver and trigger assembly below, my switch-barrel rifles. This will, however, be covered in much greater detail in a forthcoming issue of American Gunsmith. In the process of re-

moving an ordinary rifle barrel from its action for the first time, a great deal of torque must normally be applied.

This can range well in excess of 250 foot-pounds and even more on a non-lubricated barrel joint. I normally use a special receiver-wring wrench here. The lateral friction force interfacing the barrel-to-receiver joint is termed axial preload and will vary markedly among rifle builders and rifle manufacturers. Here I will briefly describe the amount of barrel torque or axial preload that I have used in working with more than 150 precision fitted barrels to switch-barrel rifles.

I have made reference to this in my various writings but it bears repeating. Attaining optimal or desired axial preload at a barrel joint is dependent on several factors. These include major barrel thread diameter, thread pitch (threads per inch), thread lubrication (type or absence of it), as well as the condition of the

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threads, barrel and receiver shoulder smoothness, and the leverage of the torque system used. I'll not go into the details here regarding all these applied factors but will assume a good barrel thread exists and some form of lubrication is applied to the barrel threads and shoulder to assure a more uniform barrel thread and shoulder contact, as well as reducing wear at the pressure surfaces.

With a T-shaped torque bar about 20 inches long and the barrel securely held in a good barrel vise, apply about 100-120 foot pounds of torque to the action wrench coupling. If you have never used a torque wrench, perhaps you have changed a flat tire on a vehicle. The normal torque applied in hand tightening or loosening an automobile wheel lug nut would feel much the same as that applied when turning a barrel onto or removing a rifle barrel from a receiver.

I am not referring to a wheel lug nut torqued in place by a gorilla mechanic at some garages. My tests with barrel/receiver torque clearly demonstrated there is a fair amount of leeway or forgiveness in applying barrel torque in attaining sufficient or workable axial preload at the barrel/receiver juncture. I learned that torque ranging from 75-90 foot-pounds using suitable forms of lubricant work out well.

Torque application was later applied and tested on many barrels, as low as 40 foot-pounds with no significant or measurable difference in accuracy or bullet point-of-impact as compared to torque in the range of 75 to 90 foot-pounds. On several instances I have turned a barrel on hand tight, displaying groups under half-minute accuracy. I have also removed and replaced a barrel between shots, displaying equally good accuracy. But this is accomplished only with a perfect contact at the barrel to receiver joint.

Variance in barrel torque at these ranges will not significantly alter cartridge headspace and is not a significant factor. Be consistent in removal and installation of a rifle barrel for top performance. Stock Bedding Revision I viewed the Weatherby Mark V single-shot, Super Varmint Master action as a most worthy candidate for switch-barrel application. The composite factory stock has a bedding block machined from aircraft-grade 6061-T6 aluminum which augments the strength of the single-shot receiver.

This did not, however, preclude my total inspection followed by the addition of a central action screw on this three Far Center, action wrench with torque bar couples. Below, Weatherby Mark V standard action receiver, no-scratch, no-slip barrel jaws designed by the author are used in a vise to remove and install switch-barrels. These jaws can be used to hold and remove even the most stubborn barrels while the scoped action remains in the stock.

THE WEATHERBY MARK V SWITCH BARREL CONTINUED

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pound stock. This required a central brass bedding pillar and lower stock escutcheon midway between the existing front and rear action screws. A solid block of aluminum was also bonded into the existing magazine cut out. These were cast in place with Brownells Steel Bed. I then bedded all the action-to-stock surfaces with Steel Bed for a precise microscopic fit. All this resulted in one of the most solid receiver-to-stock bedding contacts possible.

Stock bedding has a far greater influence on pure accuracy than is often realized. Cartridge and Barrel Selection Four barrels were chambered to the Weatherby Mark V single-shot rifle over an extended period of time. Barrels can be removed and replaced from beneath the scope in less than five minutes, spanning a few years. The first chambering was a .22-250 Remington, original factory, Criterion 26" 1:14 twist, varmint weight barrel. This barrel was received with the rifle.

The second barrel was a 26" Broughton R5 varmint weight in caliber .257, chambered for the .257 Ackley Improved with 40-degree

shoulder. I've had a great deal of experience with this cartridge and despite the often maligned .257 bore, it's a very accurate target and hunting round with good bullets. This was chambered and headspaced with a reamer from Clymer Tool (ClymerTool.com, 877/REAMERS).

The third barrel was a Criterion (Criterion-Barrels.com, 1:10 twist, 26" varmint weight barrel, chambered for the .243 Winchester. More recently, the fourth barrel is of special importance to me. It is a 1:8 twist Broughton R5 barrel from North Manufacturing Co. (Rifle-Barrels.net, chambered in 22 PPC. I used a 0.2520" neck reamer from Dave Manson Precision Reamers (MansonReamers.com, to cut and headspace the chamber.

I had a special purpose for this fasttwist .224 PPC cartridge, pitting it against the .224 Valkyrie at a later date in both long-range target work and benchrest shooting, including the use of heavier long-range bullets requiring a faster barrel twist. Threading and chambering barrels for the standard Mark V Weatherby receiver required close attention

to detail. The thread shank is 0.870" in diameter with thread length of 0.890" at 18 threads per inch.

Cartridges are chambered flush with the end of the recessed barrel. The claw type extractor reaches 0.125" into the bolt recess for extraction requiring some extra attention in the barrel fitting process. Minor adjustment of the extractor was also required allowing it to latch onto the smaller 0.441" PPC case rim. Normal .30-06 and .308 cartridge rims are 0.473" so it was necessary to re-fit the extractor allowing the hook to go into the side of the bolt face about 0.020" deeper.

Scope and Mount Selection As I get into serious testing and evaluation of my shooting, anything short of high quality optics would not make the grade. There is nothing more disconcerting than to have a scope or mounting system compromise my testing efforts. For this finelooking rifle I went with a Sightron

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Target shown from top left, .257 40-degree Ackley Improved with Broughton 1-10 twist barrel with two 100yard groups on left made with 87 grain Berger bullets. 300 yard group on right with 75 grain Hornady V-Max bullets. Top right, .22 PPC Broughton 1-7 twist barrel with 14 (5-shot) groups made with 52 grain bullets by Sierra, Berger, Shilen, and Nosler. Groups range from 0.225-0.425 MOA. Bottom left, .243 Winchester 1-10 twist Criterion barrel. Groups on left at 100 and 300 yards made with 70 grain Sierra bullets.

Two 100 and 300 yard groups made with Hornady 75 grain V-Max bullets. Bottom right targets from .22-250 Remington 1-14 twist Criterion barrel with 100 and 300 yard groups made with 55 grain Sierra bullets. All four barrels deliver some very impressive groups. (SightronUSA.com, SIII SS 45x45ED 30mm scope. This 30mm side focus scope has 1/10 MOA adjustment and performs with the best of them. I used the Talley mounting system for mounting the scope totally in-line and as solidly as can be mounted.

A Picatinny base for Weatherby Lightweight (six lug, No. P0025706) and Talley Signature Picatinny 30mm rings (No. TSP30M) from Talley Manufacturing (TalleyManufacturing.com, was used. Testing As each new barrel was added to the switch-barrel set-up, some pretty serious

load and testing workup ensued. Case necks were outsideturned to within 0.0005" wall variance. Loaded rounds were tested at near zero runout at the bullet ogive, case neck, and case rim. After fire-forming, cases were then neck sized only.

As a result of uniform case neck preparation, bullet seating pressure is maintained to a minimum. All bullets were seated approximately 0.005" off the lands for each cartridge. Federal Gold Medal standard rifle primers were used on those handloads listed. Redding Competition handloading equipment was used in case preparation and load assembly (Redding-Reloading.com, Each rifle is somewhat different... some in many ways.

Things like trigger pull, how well the rifle conforms to the rest, and sighting equipment all come into play. The shooter is also tested throughout the process when extreme bench shooting technique must be flawless. Relatively few shooters really master the art of shooting a rifle from the bench well enough to rule out, or at least minimize, shooter error, particularly where groups hover well under half MOA.

My test routine with anew barrel invariably involves one of my well proved break-in routines, which normally begins with an alternate shoot-and-clean technique until copper fouling subsides, if present. This may involve as few as a half dozen shots to

a few dozen. A well-lapped, quality barrel has invariably been easier to break in. As a note and worthy of mention, if a barrel is a poor performer during the break-in process it seldom comes through as a good shooter.

This has been borne out through the break-in process of scores of barrels that I have evaluated. It became increasingly apparent early in my testing and evaluations that the Weatherby Mark V switch-barrel was a winner. It rivals some of my better benchrest guns, particularly in .22 PPC, with many groups well under quarter MOA. Each newly adopted barrel and cartridge became anew entity with a fresh and distinct meaning. I guess this is what keeps it all so challenging and interesting for us.

But we must not take for granted how fortunate we gunsmith/writers are in having the opportunity to work with and represent those worthy products that involve this most intriguing shooting sport. The chart includes some of the tested loads representative of each of the four barrels fitted to the Weatherby Mark Vswitch barrel rifle. Space precludes a more complete listing of the many loads tested. Bullets were seated 0.005" off the lands.

Groups included fiveshot, slow-fire, under varying wind and weather conditions. Listed loads are valid only in the test barrels shown. Powder charges were reduced by 10 percent



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and worked up while watching for pressure signs. The publisher cannot accept responsibility for errors in published load data. AG

MEASUREMENT & INSPECTION

Reader Forum

BY AMERICAN GUNSMITH EDITORS MARCH 2019

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Restoration Info I have a Model 67-H Springfield pump shotgun in 12 gauge brought to me in pieces and I need assembly instructions. Also, I'm looking for a supply of .228 barrels for restoring several .22 Savage Hi-Power (5.6x52mm R) rifles. Numrich (gunpartscorp.com, lists Series 67/67-H shotguns made by Savage, Stevens, Springfield, and Fox with a list of available parts and a schematic. Pac-Nor (Pac-Nor.com, makes five-groove 0.228" barrels in 1:8 and 1:10 twist.

While not explicitly listed, Krieger Barrels (KriegerBarrels.com, regularly makes barrels from .20 caliber (.199 bore diameter) to 4 bore (.936 bore diameter) and can probably accommodate you as well. Molina 45 A customer brought this pistol into my shop stating that the trigger is not working. A quick check indicates there is no tension on the trigger. I removed the right grip to examine the relationship between the trigger bar and sear. The trigger bar is in a lowered position and is not engaging the sear at all.

Manually cocking the pistol and engaging the trigger bar with the sear fires the pistol. In following normal function manually, the slide moves to the rear pushing down on the disconnecter to disengage the trigger bar from the sear. Continuing the rearward movement, the slide cocks the hammer and resets the sear.

When the slide moves forward into battery position there is nothing that I can identify that lifts the trigger bar to re-engage the sear or the disconnecter to return to the upward position and engage the cut out in the slide. Again, with the hammer in the forward position there is no tension on the trigger. Gary Faeth I have completely stripped the frame and slide and thoroughly cleaned and lubricated the pistol. It is still not functioning. S. D.

Shearman Artesia, NM John Higgins John's Gun Repair From author RK Campbell. These pistols were sometimes made of softer steel despite claims to the contrary. This gun works like a Llama (the 1911 pistol made in Argentine) and looks like a Colt. My best guess is that the action bar/trigger bar is too short. Hit it with a hammer to peen it a bit longer and that may work, or at least indicate if it's the correct assessment. Also of note, the BM has a pivoting trigger. There are no other designs quite like it.

The pivot angle may be off. Numrich has a schematic online: GunPartsCorp.com/gun-manufacturer/ballester-molina/molina-45 AG

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