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### How To Build Your Own Remington 700 - Part I

By: Larry Weeks

Building your own custom rifle has always seemed too far beyond the skills of the average Joe. But with a lot of patience, a little skill and some guidance from Brownells you'll learn how to build a custom Remington 700.

This is the first of four articles on how to build your own custom rifle. Iâ€™d been looking for an excuse to build a nice, easy handling, knockabout sporter rifle, so when the Remington 700 Short Actions arrived here at Brownells, I figured now was the best time to get going on the project.

Soon, what was going to be a simple sporter became another "test piece" for the products and processes we include in our catalog. The various sections of this article will tell you what parts and tools we used, and show how you can build your own Remington 700.

Part 1 will cover chambering, barrel crowning and assembly. In Part 2, weâ€™ll head to the range, then bed the action to the stock, adjust the trigger and do some more shooting. For Part 3 weâ€™ll accurize the action and, finally, head back to the range for another session with factory ammo and handloads in Part 4.

I enlisted the help of one of the shooters here, Marc Dâ€™Aguanno. Besides being an accomplished benchrest shooter, Marcâ€™s also a darn good gunsmith and volunteered to give expert supervision as I assembled the barrel and action. So, letâ€™s get started.

### PART 1

### Choosing All The Right Pieces

If you havenâ€™t decided what caliber rifle youâ€™d like to build, be sure to check out the [Remington Action](#) page for all the specifics on the two actions and for links to the products you can use to build your own custom rifle. You might also want to check out the [Remington Schematics](#).

For my custom rifle, I wanted to build something that would be a great, all-around rifle - a nice .243. So, I needed the **Standard Receiver** which uses the **.308 bolt face**. The choice was easy because the .308 Bolt Face is clean and simple, one of the reasons the Remington is a favorite for custom and tactical rifle builders. If your dream rifle is in the .222 family, check out the [Small Receiver](#).

For a barrel, I chose a chrome moly, pre-threaded, short-chambered, [Brownells/Shilen](#), .243, in a Remington, factory standard taper. Yes, I know, youâ€™re supposed to get a big, stout tube thatâ€™ll shoot to the same spot all day long. But, you carry a gun more than you shoot it, so I overrode Marcâ€™s objections and went with a lighter weight. The barrel came with an oversized recoil lug to help keep it located properly.

Note: This applies to all the products used in the article: Brownells carries a very large selection of barrels, rings and bases, stocks, etc., all of which do same job, but each do it a little differently. The differences in their features may make one brand suit your specific application better. We picked the pieces used here, sometimes for specific reasons, sometimes because either Marc or I just wanted to see how they worked.

For a scope base, we picked the [Farrell Tactical](#) because it features bedding grooves in the bottom. Since weâ€™re planning to do a super tune on the gun, bedding the base to the action just makes sense.

Tactical Precisionâ€™s [TSR Steel Scope Rings](#) were the ring choice. With four screws holding each ringâ€™s halves together, thereâ€™s plenty of clamping power.

The [stock](#) is from H.S. Precision. Itâ€™s reinforced with fiberglass, Kevlar, and graphite for strength and includes a built-in

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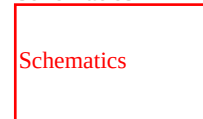


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bedding block, which should help accuracy, even before we bed it. I bypassed the Remington, factory plastic ADL triggerguard and chose a [factory steel triggerguard](#) part. I also chose a [Remington's magazine, follower and spring](#). I didn't buy a scope at this point. I borrowed a 4-14X x 50 I.O.R. Valdada from Marc. When the crew had my order all picked, I was like a kid at Christmas. Now to put it all together!

#### ***Putting Action and Barrel Together***

To put a barrel onto an action, you'll need basic gunsmithing tools, plus a few specialized ones. We'll cover the special tools at each step. First, you absolutely have to have a wrench to turn the action onto the barrel threads. Brownells makes a good one that uses a handle and interchangeable heads for darn near every commonly-worked-on action. The complete [Action Wrench](#) I ordered includes the handle and a two-piece head for the Remington 700. It's important to have a stout wrench so you won't bend or twist the action.



*Our 700 Action in the Brownells Action Wrench. Note the screw in the wrench head to help locate the action correctly, and the cutout for the Recoil Lug.*

To make sure you don't scratch the action, wrap it with masking tape before clamping it into the wrench. Position the action, and use the front action screw to hold it in place. We photographed the set-up without the tape so you could see everything.



*The taped action, the wrench with Remington 700 head attached, and the bolt, with firing pin, ejector and extractor removed.*

Of course, you have to hold the barrel tightly as you turn the action on. You could sneak by with a vise jaws in your bench vise, but one slip and you'll have a marked up barrel that will require polishing. I used [Brownells Barrel Vise](#) with the #10 bushing to match the barrel's shank diameter. Before you crank the action onto the barrel, put a dab of [Brownells Barrel Assembly Paste](#) on the threads. It will make assembly easier, and keep any moisture that gets into the threads from causing rust. Place the recoil lug over the threaded shank of the barrel.



*The action (top of photo) is almost completely screwed onto the barrel.  
The barrel is clamped in the Barrel Vise (lower edge of photo). The barrel lug (center of photo)  
covers the remaining exposed threads.*

Turn the action onto the barrel threads. Once action and barrel are close, swing the recoil lug into the recess of the action wrench. Bump the action up against the shoulder and give it a little tweak with the wrench. You don't need to lean on the wrench; snug will hold everything together very well.

### **Chambering By Hand**

Chambering your rifle is probably something you thought could only be done by machine or professionals. It's not as hard as you may think but it requires a patient hand. You've probably read things about chambering -- turn the reamer, remove, clean and check headspace until the bolt will just close on a "GO" gauge.

Well, while the process is that simple, this was my first time to actually do it, and let me tell you, it's nerve wracking. You have a \$200 barrel and a lot of work you will have to re-do, not to mention the embarrassment of having to admit you screwed up if you do it wrong. Not being a patient person, I gave myself a real talking to before I started. Instead of cranking away on the reamer until I went too deeply, I made a promise to go slowly, no matter how long it took.



*The tools for chambering. Do-Drill, GO and NO GO headspace gauges,  
a small brush for cleaning chips and the chambering reamer and extension.*

It's time for some more specialized tools. You'll need a reamer and headspace gauges. These are specific for each caliber. We picked Manson brand products. Our .243 required a **reamer**, plus a **GO Headspace Gauge and a NO GO Headspace Gauge**. Brownells recommends using both the "GO" and the "NO GO" gauges. That way if you cut a bit past the "GO" gauge, the "NO GO" gauge will let you know if you're still within spec. The bolt should close on a "GO" gauge but not on a "NO GO" gauge.

Before you start working on the chambering, you'll need to completely disassemble the bolt. Kleinendorst makes a **Bolt Disassembly Tool** that's a big help. You'll also need **Brownells Bolt Ejector Tool** to get the ejector out without spending a lot of time digging for the spring and plunger when they fly across the room. The extractor is sort of like an internal C-clip. Once the ejector is out, use a scribe or tiny, flat screwdriver to rotate the extractor, clockwise, slightly in the bolt face, until the end of it moves into the access cut in the bolt face. When it sticks out far enough to get your scribe/screwdriver between the access cut and the extractor, push it, carefully, towards the center. Compress the extractor enough to pop it out of the bolt face.

The first step in actual chambering is to set the barreled action vertically in a vise. I left the assembly in the Barrel Vise and clamped the whole works into a bench vise. This makes sure (the best you can without a lathe) that the reamer will stay straight in the precut short chamber. It also makes it easy to flush chips out from the chamber as you stop to check

headspace. Youâ€™ll need to put a pan or tray of some sort under the muzzle to catch the oil, chips and TCE that you flush out. To turn the reamer, you can buy a Clymer extension that fits the **3/8" square shaft** or, you can use a long extension for a 3/8" socket set â€“ the socket set extension method makes it a lot harder to get the reamer out of the chamber for cleaning, but you can do it. Either way, you have to have a big tap handle; I picked mine up at Northern Hydraulics. Get a good, high-grade cutting oil. My favorite is **Brownells Do-Drill**. Itâ€™s slimy, sticky and smells pretty horrendous, but works great! Iâ€™ve tried to cut things using motor oil, various gun oils, etc., but you really can feel the difference when you use a real cutting oil. Donâ€™t skimp on this step.



*The reamer, with extension in place, started into the barrel.*

Slip the reamer into the extension and snug the set screw down against one of the reamerâ€™s flats. Lube the reamer and its pilot thoroughly with Do-Drill, and slide it carefully into the chamber. For the first cut, I turned the reamer four revolutions, while pushing down firmly on the tap handle. To remove the reamer for cleaning and checking with the Headspace Gauge, relax the down-pressure, keep turning **clockwise** and pull it out of the chamber. **NEVER turn a reamer counterclockwise! For any reason! You will dull it instantly.**



*Clean the reamer and chamber thoroughly with TCE.  
Use a small brush to get rid of stubborn chips.*

Clean all chips and Do-Drill off the reamer and flush the chamber to make certain thereâ€™s nothing to cause the GO gauge to give a false reading. I used **Brownells TCE** and ran a chamber mop and a bore mop through to make sure all chips were really out of there. Slip the GO gauge carefully into the chamber. Put the stripped bolt into the action; slide it down, gently until it contacts the GO gauge. Try to close the bolt handle. At this stage, it shouldnâ€™t even come close to dropping into place.

After the initial four revolutions, I went to a remove, clean, and re-oil every two revolutions schedule. The progress of the reamer happens very slowly at first and when the chamber is close to full depth it moves very quickly. That's why it's important to check often. The first cuts will show chips only in the case body area of the reamer. Nowâ€™s the time to really keep being patient. It takes a lot of "cut-and-clean and re-oil" to get to the shoulder. After three cut-clean-and-check cycles youâ€™ll be tempted to crank for several turns before checking the headspace. DONâ€™T do it!



*Early cuts will produce chips well back in the body area of the chamber.*

When you see chips develop in the shoulder area, it's time to slow down. One turn, clean and check, isn't out of line here. You don't want to have to force the bolt handle down, and you don't want it to fall into place. You want it to "close" on the GO gauge with just firm pressure.



*The chips are now very close to the shoulder. BE CAREFUL, GO SLOWLY.*

It's a slow process. I spent roughly 45 minutes cutting, cleaning and checking until the bolt finally closed properly on the GO headspace gauge. I followed with a thorough cleaning of the chamber and bore to get rid of any remaining chips and cutting fluid.

#### ***Crowning the Muzzle***

Custom barrels have usually been located between centers on a lathe during manufacture. That means the first portion of each end of the bore could be slightly damaged. Chambering took care of cleaning up the breech end. It's up to you to fix the muzzle end. Most makers suggest you cut off the first 1" of the barrel to get rid of any tooling nicks. You can cut off more for a shorter barrel, but you do have to cut off that first inch. Marc and I marked the cut with a pencil at several places around the barrel diameter. I've always found it easier to get a straight hacksaw cut on a round, tapered object by connecting the pencil marks with shallow cuts. That means rotating the barrel periodically and slowly deepening the cuts until you're all the way through.

When you have a fresh cut to smooth and square up, **Brownells Muzzle Facing and Chamfering** cutters can help get a professional job. You can square and finish the muzzle with a good, flat file, sandpaper and a micrometer eyeball, but I've never had much luck doing it that way. A **90° Facing Cutter and Steel Pilot** for the .243, plus a **3/4" diameter, 79° Crowning Cutter** were the special tools needed for this part of the project.

To do the crowning, lock the barrel firmly in a horizontal position in Brownells aluminum **V-Groove Vise Jaws**. Screw the handle onto the cutter, slip the pilot into the cutter and tighten the setscrew. Get out the Do-Drill and generously coat both cutter and pilot. Insert the pilot into the bore and make a few clockwise revolutions. Pull the cutter back and check your progress. Before you put the pilot back in, clean the face, cutter and pilot with TCE. Make sure no chips have gotten into the bore. If any have, clean them out. Re-oil the cutter and pilot and continue cutting until all saw marks are gone.

The idea of a crown is to set the rifling at the muzzle back, just slightly, to protect the rifling from handling dings. Damaged rifling at the muzzle can seriously affect accuracy. The 11° target crown (90° - 11° = 79°) is one of the more popular angles. Brownells also has a **45° Chamfer Cutter** if you prefer a deeper recess. The chamfering process is the same as the facing process; cut, inspect, clean, re-oil and cut some more.



*The 79° cutter in position to make the crowning cut.*

Marc didn't take the chamfer cut all the way out to the full diameter of the muzzle. By stopping just short, he left a small, 90° ring for a neat, finished look. The final step is to lightly sand the sharp edge where muzzle and outside contour meet.



*The finished muzzle crown and chamfer.*

#### **Mounting the Scope Base**

This is pretty easy. Mount the barreled action horizontally in a stable bench vise horizontally. Dead-level doesn't matter here. Put a tiny drop of Loctite #242, #532-000-009, into the base screw holes in the receiver, set the scope base in place, insert and tighten the screws.



*The TSR rings positioned on the Farrell base.*

#### **Putting the Action into the Stock**

Another easy task, for someone who's just chambered a barrel. Slip the Remington magazine box into the stock recess, add the magazine spring and follower and set the action into place in the stock. Hold stock and action together, turn them over and set the triggerguard into place. Drop in the screws **Center Guard Screw Hex**, **Front** and **Rear** and snug them down.

#### **Mount the Scope in the Rings**

Many tactical rings, like the TSR's, are made with the top and bottom halves machined together for a perfect fit. Don't switch the tops from side to side or try to mount one top half to a different bottom half. Scribe marks on the inside of both halves to help make sure nothing gets mixed up. Take off the top halves of the rings and set them off to the side. Lay the scope in the lower ring halves, shoulder the gun and check for proper eye relief. Slide the scope as needed and/or move the rings to different slots to get the correct eye relief. The multiple cross slots on tactical bases, like the Farrell, simplify the process.

Finish up by reinstalling the ring top halves and snugging the screws down evenly. Since this is the "bolt together" phase of the build up, Marc and I didn't bed the base, lap the rings, or use a torque wrench on any of the fasteners.

**NEXT MONTH** - We go shooting. A quick preview, shooting from a wobbly picnic table, with a heavy trigger and

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**How To Build Your Own Remington 700 - Part II**

By: Larry Weeks

Last month we built our own Remington 700 from parts and tools all available here at Brownells. It was a lot easier to complete than I had anticipated. For a quick review of last month's article [CLICK HERE](#). Now, as promised last issue, we're going shooting.

I shoot a lot of commercially reloaded ammo because I'm too lazy to reload, and too cheap to buy new, so I figured we'd start with the ammo I'd most likely be using in the future. If accuracy wasn't what we hoped, we could always pick up some premium, factory stuff to use as a benchmark. Cloverleaf Reloaders, an outfit in nearby Prairie City, Iowa recommended a couple of different loads. The first has an 80-grain, soft point, boattail bullet over 40 grains of 2700 and delivers 3100 fps. The second has a 100-grain soft point bullet driven to 2700 fps by 35 grains of 2700. When Marc saw the 2700 powder designation, he wasn't thrilled. He has other favorites in the .243, but, since I'd already bought the ammo, we had what we had.



Our project 700 set up and ready to do some shooting.

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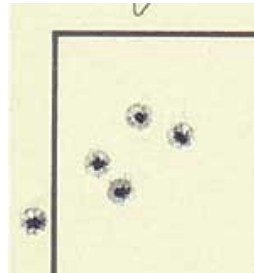
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Our local sportsman's club doesn't have heavy-duty benches, or even light duty ones, so, a wobbly picnic table served as our bench. Marc brought his forend rest, sandbags, spotting scope, targets and cleaning gear. Sure is great to have friends with good gear!

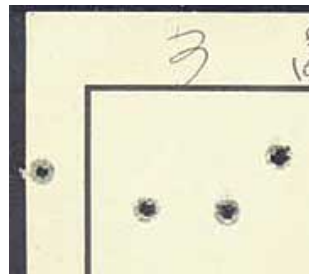


Marc's 80-grain group.

My first 5 shots of 80-grain went into sort of a circle measuring just under 2". Couldn't have been me, so I blamed the 6-1/2 pound factory trigger pull. But, once we got started, we figured we'd better stick with it to make everything equal. Marc followed the first five with a thorough cleaning using **Shooter's Choice**, followed by **Sweets 7.62 solvent**, **J-B Bore Cleaner** and another dose of **Shooter's Choice**. Each cleaner, and each subsequent cleaning, was followed with dry **patches** so we'd always start with a dry bore.

There's an art to group shooting and many people do it a lot and very well. I ain't them! Minute of coyote is my standard. But, if you want to test a gun, group shooting is a necessary evil. Marc wanted to do a lot of benchrest things, and we even talked about building a decent bench. But, I'm an average shooter; high tech for me is using my truck's hood as a rest and a cardboard box as a target stand. So, Marc cringed and agreed to stay closer to my level. No one should have trouble duplicating, or bettering, our results.

Marc took over at the bench and his five rounds of 80-grain ammo produced a group that came out at 1-3/8". Another thorough cleaning and we decided to try the 100-grain ammo.



100-grain, 1st group, 5th shot off the paper.



100-grain, 1st group, 5th shot off the paper.

The first five 100-grain shots were rather disheartening. The group strung out horizontally and covered a full 3". Marc cleaned the bore again and the second group began to look a little better. It covered just under 1-3/4" and had a more round shape, but still with a bit of horizontal stringing that Marc attributed to the thin, sporter-contour barrel heating up.

Next, it was my turn. After my first disaster, Marc taught me his group shooting technique. The targets he brought had a black, square, box border. The trick was to line up the vertical crosshair on the vertical border and the horizontal crosshair on the horizontal border at the top left corner of the box. By sighting the rifle to hit low and right of the corner, our aiming point was never destroyed. Plus, having two 90° lines to index on gave a constant check to make sure you were lined up.



*My 80-grain group.*



*Finally! A 1â€• group.*

My group with the 80-grain bullets was building nicely until the last shot went high right which opened it to 1-3/8â€•. Still, I'd matched the benchrest guy, not too bad for someone who hates bench shooting and can't keep constant pressure on the bags, the gun's wrist or his shoulder. Another cleaning and I dropped in a 100-grain load. Marc attributed the 1â€•, five-round group to the barrel beginning to get broken in. I thought it was just great skill. It was probably dumb luck. Whatever it was, the gun showed that it didn't hate the 100-grainers as much as we first thought.

Next, we got out some factory Winchester 80-grain and 95 grain loads. Neither Marc nor I could get a group that we want to talk about with the 80-grains. Marc turned in decent group shooting 95-grainers with one flyer (not called) that turned what could have been another 1â€• group into 1-9/16â€•.

To finish up, I went back to the 100-grain Cloverleaf and put five into just under 1-1/8â€• with two distinct groups making the one. The last group had three shots in one hole plus two flyers (not called) which the gun seemed to do consistently, for 1-1/2â€•.

At this point it seemed useless to throw more ammo down range until we did some work.

#### **Bedding the 700: The Next Step in Improved Accuracy**

Yes, I know, the H.S. Precision stock has a bedding block. But, bedding blocks have manufacturing tolerances and so do Remington actions. Plus, the term "drop-in" means everything about the stock has to be left just a whisker "loose" so if there are manufacturing variations, the action will still actually drop in. For the price of a bedding kit, we thought it would be interesting to see if we could improve the accuracy, even a little bit, by removing that little bit of slop.

Here's a list of the products we took out of stock to do the job. We already had a small, [Ballpeen Hammer](#) to drive the pin punch, a [Pistol Bench Block](#) and a [Brownells Multi-Vise](#) with set of [Red, Super Hold Vise Jaws](#) modified to slip over the vise's moveable jaw bar. Any decent-sized vise will work; just pad the jaws to protect the stock. Of course, we like the Multi-Vise.

Other products you'll need are:

[Acraglas Gel Kit](#) "the two gun kit.

[Trigger Bedding Block](#) for Remington 700

[2" Wide Bedding / Masking tape](#)

[Type A Surgical Tubing](#)

[Replaceable Pin Punch Set](#)

[Inletting Guide Screws](#) "a tremendous help!

[TCE Cleaner / Degreaser](#) "a big aerosol can.

[500 Cotton Applicators](#) (big "Q-tips" with long, wood handles - do all sorts of things with them, you'll see)

[Red Shop Cloths](#), one dozen "white are available, we picked the red "cause they look great in pictures.

From the grocery store:

Paper towels

White vinegar

Take everything apart; the scope and rings can come off as a unit, pull the bolt out of the action and take the barreled action out of the stock. If the magazine box isn't screwed to the action, wiggle it out of its recess. Taking the trigger out is easy, but, if you don't look at things carefully, putting it back in could require a look at the [schematics](#) on the Brownells web site. Thank goodness, for my sake, those are there.



*Driving out the front trigger group pin.*

Lay the barreled action on the bench block, left side down. Start with the rear pin and line it up over one of the holes in the bench block. Drive it out from the right side, to the left side, with the .090" pin punch and the small hammer. Catch the little mousetrap bolt stop spring, and slip the bolt stop out. Put the stop, pin and spring in some sort of container. Line up the front pin over the bench block hole, and drive it out. Turn the action up and slip the trigger group out. Don't let the trigger group turn upside down. The sear is now loose and it, and its spring, can fall out. They're easy enough to put back; finding that spring on the shop floor is the problem. Put the trigger group and the front pin into your small parts container.



*Position the Trigger Bedding Block.*



*Secure the Bedding Block.*

Slide the Trigger Bedding Block into the trigger recess and lock it in place with the little steel plate and the socket head screw. Now, use the TCE to degrease the action and rear 4" of the barrel. Grab the modeling clay and fill in the trigger group pin holes, the openings in front of and behind the **Trigger Bedding Block**, the bolt stop slot, and any other opening on the bottom side of the action. EXCEPT, don't fill in the front and rear action screw holes. Smooth it all out, nice and level with the metal surfaces of the action.



*Fill all recesses and pin holes with modeling clay.*

Next up, the recoil lug. The vinyl **Bedding Tape** really shines here. Cut an inch and half wide (roughly) by three-inch long strip and lay it across the front edge of the recoil lug and let it fold up, along the barrel. Use something square edged with a fairly sharp corner, like the back of a closed pocket knife, to push and stretch the vinyl tape to make it follow the curve of the barrel where it meets the recoil lug. Once the tape is shaped and stuck down tightly trim the excess off the recoil lug. You just want a layer on the front face to make it a bit easier to get the lug to slide out of the recess. Use the light, **ballpeen hammer** to tap along the edge where the tape meets the edges of the lug. Let the hammer kind of bounce lightly and work back and forth across each edge until the lug's edge cuts through the tape. Peel the extra off. Trim the tape along the joint between barrel and lug so all that's left is a perfect cover over the front of the recoil lug.



*Stretch the vinyl tape across the lug and up the barrel.*



*Tapping with the hammer will cut the tape cleanly.*

Open the Acraglas Gel kit and get out the small bottle of Release Agent. Grab one of the Cotton Applicators and dunk it in. Swab the bottom of the action, all of the Trigger Bedding Block and up, around the sides of the action, the magazine box opening, the entire top of the rear tang area, all sides of the lug (including the tape) plus the tape on the barrel. Run it up the sides farther than you think you need to; bedding compound seems to find its way onto everything – even Gel, which doesn't run. One of those facts of life that can't be explained.



*Apply Release Agent liberally, even where you don't think you need it.*

Set the barreled action aside so the Release Agent can dry and clamp the butt section of the stock, gently, in the Multi-Vise. Get the modeling clay out and fill in the bolt handle cut. Cover about four inches of barrel channel ahead of the lug recess with tape, and tape along the top edges of the stock and around the rear tang. Next, make a clay worm about two to three inches long and 1/8" in diameter. Lay it on top of the tape, right in front of the lug recess. It'll act as a dam to keep the Gel that squishes out from working its way down the barrel channel.



Back to the barreled action. Here's a neat trick Marc showed me. Wrap the Inletting Guide Screws with bedding tape. Two or three times around should do. This will make sure there's clearance around the screws and that no bedding will get into the holes and create an extra recoil lug. Be careful, the first time I tried it, I got too much tape on and the screws wouldn't fit the holes at all. Marc took off a couple of layers, leaving a bit of clearance. Screw the Guide Screws into the action, give them, and their tape a thorough coating of Release Agent, along with adding a second coat to the rest of the action – that means cover everything you did before, again. Get the Release Agent up, around the sides of the action and on top of the rear tang – did I mention that bedding compound can find its way anywhere?

It's time to mix the **Acraglas Gel**®. Have a bottle of vinegar close by to clean the measuring spoon, and your hands, during and after the mixing process. Dig a glob of the white resin out of the jar with the measuring spoon. Grab the tongue depressor and pack the resin into the spoon to eliminate any voids. Now, scrape the excess resin off the spoon with the tongue depressor. Return the extra to the resin jar. With your third hand, set the mixing cup on the bench, upside down. Scoop the measured resin out of the spoon and put it in the dished, outside, bottom of the cup. Mixing on the bottom makes it easier to get all the resin and hardener mixed together, plus it's really easy to pop the left over, setup Gel off the bottom

before the next project.

Wet a paper towel with vinegar and clean the measuring spoon thoroughly. Dry it with another towel and dig into the Hardener jar. Do the same, pack, level, scrape and scoop routine.



*Clean the scoop with vinegar.*



*Scooping the hardener out of the jar.*



*Scrape excess back into the jar.*

Poke a pin hole in the black dye packet and add two or three drops to the unmixed Gel. Don't overdue the dye, add only a drop at a time. Use just enough to get the perfect color you want. Use the tongue depressor to stir, fold, and mix the dye and the Gel until it turns jet black and no resin or hardener remains unmixed.



*Add a few drops of dye; go easy!*

Take a deep breath and start spreading the Gel into the stock. One glop goes in the recoil lug recess. You don't have to fill the recoil lug area, there's not that much space to take up. Put a layer along the inside of the stock where the sides of the action rest, and another coat where the rear tang sets.

If the butt of the stock isn't clamped into your bench vise, with a support under the forend, do that now. If you have a friend around you can skip the vise and make him/her hold the stock. Carefully slide the barreled action into place, and squeeze it down, into the stock with firm hands pressure, getting it all properly lined up.



*Dropping the barreled action into the stock.*

Grab the Surgical Tubing and thoroughly wrap the stock and action with it, stretching the tubing for each revolution. Set the gun aside, just make sure there's no stress on the barrel or action that could change their position.



*Looks pretty ugly wrapped with surgical tubing.*

Clean up the measuring cup with vinegar, pitch the tongue depressor, and clean up the area. Now, walk away and do something else for three to four hours.

While you're ignoring the temptation to mess with the gun, find a scrap of wood or plastic and make a sharp edged "knife" or scraper. Once the three to four hours, (okay, three hours and two minutes) is up, unwrap the surgical tubing. DON'T try to take the barreled action out of the stock! Use your plastic/wood knife to cut away the rubbery bedding material that has squeezed up out of the stock. What you're doing here is avoiding a mechanical lock. Cut along the top edges of the stock and especially around the rear tang. The tang can't set "in" the bedding, it should only rest "on" the bedding.

Once you've cleared away all the excess bedding, you'll know how much the Gel has set up. Depending upon the temperature and humidity, three hours may be fine for the next step; you might have to wait five hours if the room temperature is low and the humidity is high. The step we're talking about is taking the barreled action out of the stock for inside cleanup.

Flip the gun over, make sure there's something soft underneath, and start working the barreled action out of the stock. Since everything is at zero clearance, this isn't easy. Go slowly and kind of wiggle it out a bit at a time. Alternately pressing down on the barrel, then on the action (stick a wood dowel inside the bolt raceway) and, sometimes, even a thump on the inletting guide screws with a plastic hammer is necessary. Depending on how tightly those tape-wrapped screws fit in their holes, it can help to unscrew them completely from the action.

Once the barreled action is out of the stock, start cutting away the Gel that has snuck into the magazine box recess, around the trigger bedding block, etc. If you cut down to the aluminum block, all the way around, you'll be in good shape. If you wait until the bedding has set completely, you'll need to use something like a Dremel or Foredom tool, a die grinder or chisels and files. Peel the tape off the front of the recoil lug and put the barreled action back into the stock for at least another eight to twelve hours.

Gel reaches full strength in 24 hours, but you can pull the barreled action out again around 18 hours and finish the clean up. Take all the clay filler out of the action and the stock. The round, wood stems of the cotton swabs can help dig down into the recesses, and poke through the screw and pin holes; soak the cotton end with TCE and wipe the surfaces, peel the tape out of the barrel channel, and get all the release agent off the metal. If you haven't done it already, pull the Guide Screws out and take the **Trigger Bedding Block** off. Once everything's clean, give the metal a light coat of oil and start putting it back together.



*Start removing modeling clay, bedding tape and Compound that has oozed into various places.*

When you start putting the trigger group back in, don't turn it upside down. The sear and its spring can fall out easily. Putting the bolt release and its spring back in is the trickiest part, I found. Get the trigger group in place and drive the front pin in, all the way. Clamp the action into the vise, otherwise you'll need at least three hands (four would be better).

Hook the short leg of the spring over the receiver, behind the trigger group. Hold the round loop in the recess, drop the bolt stop into its recess next to the trigger group and hook the long leg of the spring over the front of the bolt stop. Now, try to line up the rear pin through all the pieces and tap it into place. I messed around for quite a while, swearing, dropping pieces and getting more frustrated until I finally stopped, went to the tool box and used the middle size replaceable pin punch as a

slave pin and followed it through with the pin. If you have access to the Brownells web site, find the [Remington 700 schematic](#) and you'll see how things fit.

Put the magazine box into its recess, add the follower and spring. The spring kind of gets a weird angle to it and can goof up your reassembly if you don't make sure the stock goes over it correctly. Get the action into the stock, or the stock onto the action, put the triggerguard on, the screws in and tighten them down, snugly.

Turn the gun back over, put the bolt in and check for correct function. I missed cutting out a bit of Gel near the bolt stop lever and it was just enough to keep it from working. I took the barreled action back out of the stock, dropped the follower and magazine spring on the floor, and found out the bolt stop worked once it was free of the stock. All it took was the tip of my pocket knife to flick the piece of Gel away. Back together, flip the gun over and set the scope back on. Here's another screw up.

I didn't have a socket wrench set handy to tighten the TPS rings, so I grabbed a small, adjustable (Crescent) wrench. Kind of had to work it in at an angle and twist. I heard something scrape and stopped. Of course that was too late to avoid the gouge the tip of the wrench jaws put in the ring's finish. **Take the time to get the right tool!**

#### **Back to the Range for More Shooting**

We warmed up with the last five rounds of 100 grain Cloverleaf ammo, hoping to get a great group with what we thought was the gun's favorite, call it an evening, and head home. You guessed it, we were wrong, a couple of flyers, one called, one not, made a 1-1/2" group.



*Not a huge improvement over 1-3/8", but 23% isn't too bad.*

That left the 80 grain Cloverleaf ammo as our best hope. Three 1-1/8" groups followed by one at 1-1/16" showed our Acraglas Gel bedding project had helped even a great, bedding-block stock like the H.S. We gained 5/16", or 23% on the accuracy. All this off a really bad bench, with a nasty, 6-1/2 lb. trigger pull.

**Next month:** Before we get out the Manson accurizing tooling and start cutting, we'll fix that trigger and try some handloads. Then we'll introduce the tooling.

[How To Build Your Own Remington 700 - Part I](#)

[How To Build Your Own Remington 700 - Part III](#)



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### [How To Build Your Own Remington 700 - Part III](#)

By: *Larry Weeks*

Last month we did some shooting, bedded the action into the stock and did some more shooting. This month, weâ€™ll start out with a trigger adjustment, shoot a bit more, then explain what weâ€™re going to do next and introduce the Dave Manson tooling weâ€™ll use to fully accurize the action.

We talked a bit about group shooting techniques and I ran across an article thatâ€™s well worth a read if you want to get the best groups out of your gun. Written by Craig Boddington, it ran in the March/April, 2004 issue of Petersenâ€™s RifleShooter magazine. The issue is going with me to the range next time I shoot the project 700. If you canâ€™t find the issue, try calling 800-260-6397 to purchase a copy.

### [Trigger Adjustment and Some Range Time](#)

We knew all along the heavy, 6-1/2 pound trigger had to be fixed but also knew it wouldnâ€™t be fair to shoot some groups with the heavy pull and some with the light pull; until we reached a reasonable changeover point.

The Remington factory trigger can be adjusted for sear engagement, spring pressure (pull weight) and overtravel. But not by ME! This is one job you should leave to a competent gunsmith. My partner in crime on this project, Marc Dâ€™Aguanno, definitely qualifies and took the trigger down to a nice, 2-1/2 lb reading on the Chatillon trigger pull gauge. He eliminated the creep and the overtravel in the process.

If you donâ€™t have a good trigger pull gauge, Brownells carries a few. Be sure to take a look at the [Electronic Pull Gauge](#) from Lyman or [Premium Trigger Pull Gauge](#) from RCBS.

This was our chance to try some handloads and some more of our Cloverleaf ammo to see what the trigger work did. Marcâ€™s first 5 rounds of 95 grain, Berger bullets over 44.5 grains of IMR4831 lit by Remington 9-1/2 primers - a load that had worked well for him in other .243s - scattered like an open choked shotgun. Completely unpredictable and roughly 12â€• across! We immediately headed back to the shop where he totally disassembled the rifle to see if something was broken.

Everything checked out okay, which left Marc suspicious of the scope. We borrowed yet another one from his collection and made the 3-mile drive back to the range. This Sunday afternoon wasnâ€™t at all like the calm conditions we had been shooting in before. The wind was swirling out of the shallow valley to our south, bouncing up, over the road and its ditches, about 50 yards behind the shooting line, varying from the south all the way around to east southeast.

Since everything seemed to have gone wrong, we went back to something we knew, the 100 grain Cloveleaf loads. With the gusting wind, Marc shot a quick group just to see if we could get some sort of group. It came out just under 2â€• with no attempt to match wind conditions between shots or let the barrel cool. In went the Bergers. The first two shots were once again almost a foot apart showing that this barrel absolutely hated this powder/bullet combination as much as it hated the factory loads weâ€™d tried earlier.

He suggested I try the Cloverleaf 80 grains. I actually had the presence of mind to consider the wind strength when I squeezed the trigger for my first shot. Man, what a difference! That lighter, cleaner trigger made it so nice for an amateur like me. The shot landed just an inch or so from the aiming point, perfect for our purposes. I was so thrilled that I rushed the second shot, thinking I was invincible, but the wind gust that hit as I pulled the trigger reminded me; and blew the shot an inch and a half or so to the left. I knew it the second I fired and told Marc it was going to be out the group before we even looked through the spotting scope.

Being humbled, I was a lot more careful for number three. Weâ€™d been noticing that shots number three and four were usually the ones that expanded the group. I was very careful to try and get the same wind feel on my face as I had for shot one before I pulled the trigger. Waiting with the crosshairs lined up is absolute murder. But, with the nice trigger, I was able

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to think "shoot" when the wind felt right and bang, the gun responded. Shot number three landed just 1/2" away from the first one! Yee ha! I actually felt like I was learning something. I just about had the crosshairs lined up again when the wind dropped sooner than I expected. I finished the lineup and quickly squeezed off number four. It landed right next to number one. Now the pressure was on.

Having fired two rounds so close together, I worried about the temperature of our thin barrel. So, I sat away from the gun and let it cool for about two minutes. Of course Marc was "helping" by telling me how much the last shot counted. Having friends is so nice, isn't it? The sight picture came in instantly, the wind dropped as if on cue and shot number five dropped in beside shot three giving us a four round 1/2" cluster, with that called flyer making the total 1-9/16". With the wind whipping around like it was, neither one of us wanted go through the tension of shooting a backup group. By this time, we'd shot the gun, and the 80 grain load enough, we were confident that our gun would be capable of sub-one-inch, five-shot groups with the right loads.

What'd we learn? A good trigger makes all the difference in the world. Lightening the pull cut the group size basically in half. Of course we have to do a disclaimer here, you know, your results may vary, etc., etc. And, "gun-friendly" ammo does make a big difference.



Four shots in 1/2" with a called flyer for 1-9/16"

### Accurizing

The next step is a complete accurizing job on the action. That word gets used so much, it's darn near become like Kleenex®. You know, anything you blow your nose on is called Kleenex®, even though it's really generic "Facial Tissue." At least that's what the folks from Kimberly-Clark have to say. Accurizing is like that.

Anytime anyone does something to make a gun shoot better they call it "accurizing." I guess what we're going to do, actually Marc will do, should really be called "blueprinting." It's a term I first heard as a gear-head, car nut kid, you know, "the engine is balanced and blueprinted."

We'll use tooling made by Dave Manson Precision Reamers to square and true things up to make sure the action, bolt, and barrel are all in a straight line. Not knocking Remington, but drawings have tolerances and mass production tooling wears a bit every time you use it. Tolerances mean dimensions can be "off" a whisker and still pass inspection.

Putting everything in a line should help accuracy. How? If everything is dead straight when the cartridge goes "bang," the recoil force should make the bolt, recoil lug, action, etc. move exactly the same, time after time. Think about it, if the face of the action isn't square against the shank of the barrel, or the bolt doesn't contact the lugs inside the action squarely, the slight gap on one side "so small you can't even see it" would act sort of like hitting a nail on one side of the head. You know what happens when you do that, the nail either goes in crooked, or bends. If anything bends in our group of parts, the bullet could end up on a crooked path. Think of the cartridge as the hammer, the bolt and action are the nail.

Dave's whole tool set will cost \$500 to \$600 for the [Receiver Accurizing System](#) and the [Receiver Ring Facing Tool](#). A bit much for someone doing only one receiver. But, it doesn't require a lathe, and can be done by the home gunsmith. So, if you can get several jobs out of the tooling for Remington 700s or Winchester Model 70 Classics, it will work out.

Since we want to use the barrel we've had all along to make sure our test is valid, we picked the "Standard" Tooling. There's also a [.101" Over Receiver Accurizing System](#) that requires a barrel threaded, and on a lathe, to match the oversize dimension. That takes the project out of the home gunsmith category.



The Manson Receiver Accurizing System

Okay, after all that, letâ€™s talk about the tooling itself. First of all, itâ€™s all guided by bushings that fit inside the action, where the bolt rides â€“ guess you could call it the bolt tunnel or raceway.

The first piece is the Piloted Receiver Reamer. It does two jobs, cuts the minor diameter of the threads and squares up the bolt lug recesses inside the action. On the Standard diameter Kit, you donâ€™t really expect the cutter to do much to the inside diameter of the barrel thread area in the action, but it may take out a little bit. The big thing the Standard diameter reamer does is square up the surfaces the boltâ€™s lugs ride against in the action. Thatâ€™s a big part of the straight-back push thing weâ€™re talking about.

Next is the Piloted Tap/Mandrel. It actually re-cuts the threads, and since itâ€™s piloted off the same bushings as the Receiver Reamer, those threads will be dead-on straight.

For the receiver face, thereâ€™s the **Receiver Ring Facing Cutter**. It doesnâ€™t come in the kit, so youâ€™ll need to order it separately. Three carbide blades cut the very front face of the receiver. Since it also pilots off the same bushings as the first two tools, once again, things will be absolutely straight.

That covers the introduction to the Manson tools, next time weâ€™ll put them to work and see how much better my new Remington 700 can shoot!

[How To Build Your Own Remington 700 - Part II](#)

[How To Build Your Own Remington 700 - Part IV](#)



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### How To Build Your Own Remington 700- Part IV

By Larry Weeks

Last time, we bedded the gun, shot it a bit, and then talked about the [Manson tooling](#).

I thought using the Manson tooling was going to be the toughest part of the job but, naturally, I was wrong. Marc kept saying "No, big deal, half an hour and we'll be done." Well, he was wrong, only because I kept stopping him to take pictures. Ah, maybe 45 minutes, since he took the stock and scope mount apart while I was grabbing some supplies, but still, Manson's tooling is so well designed that everything flows smoothly.

The advantage to not having cranked the barrel and action together with a 5-foot cheater bar showed up right away in the disassembly. Marc clamped the barrel in the vise's v-grooved jaws, installed the [Brownells Action Wrench](#) and one quick tug popped it loose.

A quick clean up to get the thread lube out and make sure the action body is completely clean inside and we're ready to start. Dave Manson's tooling comes with two, tapered bushings.



*Slip the Manson Tooling Bushings into the action*

The outside taper helps them center in the action to take up any manufacturing slop. Lube them up with your cutting oil, [Do-Drill](#), [Clean-Cut](#), ( etc. and slip the .702" Bushing into the rear receiver ring, the .703" in the front. This can be a three-handed job, with two, oily bushings trying to pop out of place while you slide the lubed shaft of the [Manson Piloted Receiver Reamer](#) through the front ring and both bushings. This reamer cuts the minor diameter of the threads and squares the face, inside the receiver, where the bolt lugs ride.

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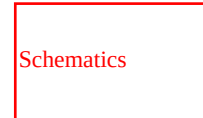


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*The Piloted Receiver Reamer ready to do its job*

Alright, I know you're thinking that cutting the lug face, then lapping the bolt lugs to it will change the headspace. You were thinking that, right? Well, yes, it can. Marc thought we'd be okay since we had the headspace set at minimum to begin with, and we'll also be taking metal off the front ring of the receiver. While the bolt will move back, the barrel should move back a bit, too.

Back to work. Stand the action up, vertically, in your bench vise. Clamp in aluminum v-groove jaws, or use the Action Wrench Vise heads to hold the action, and clamp them into your vise. Don't crush the action by doing a gorilla crank on the vise handle. Mount the big tap handle on the reamer, make sure the cutting edges are well lubricated with cutting oil and start turning the handle, slowly. When it bumps against the bolt lug face, stop. Push up on the guide shaft from below the action while you turn the tap handle to the right, and turn the reamer up, out of the action. Remember, don't turn the cutter to the left, it's not like a bolt, you don't have to unscrew it out of the hole. And most importantly, turning to the left will dull the edges. Clean the reamer and inside of the action; we used [Brownells TCE](#) to get rid of all chips. Re-lube the shaft, bushings and cutting edges, and bolt lug face; slide the reamer back into the action, the shaft through the bushings, and make sure the tap handle is tight.



*The lug face needs just a whisker more taken off to be completely faced.*

Make two revolutions with firm pressure on the tap handle. Do the remove- and- clean procedure and check the lug face for evidence of your cutting. Proceed slowly and cut until you just get a smooth cut all the way around, and edge to edge. DON'T get carried away, cut only enough to get the face even.

>After the bolt lug face is cut, lube up the [Piloted Tap](#) and run its pilot through the same bushings. Turn the tap in, carefully, until it just bottoms out.



*The Receiver Tap will clean the threads and serve as the pilot for the Receiver Ring Facing Tool.*

Here's the neat part. Leave the tap in place, take the handle off, lube the shank of the tap and slide the **Receiver Ring Facing Cutter** over the tap's shank. Again, lube up the carbide cutters, turn one or two revolutions and lift the Facing Tool up.



*Receiver Ring Facing Tool in place on the shank of the Receiver Tap.*

Take a peak to see how you're doing. Again, cut slowly, a couple of revolutions at a time, until the face is clean and uniform. Clean everything thoroughly to get rid of all the cutting oil and metal chips.



*Our receiver face was definitely a bit crooked and needs only a couple of more revolutions of the Facing Tool to be dead-on square.*

Last step. Lap the bolt lugs to match the newly squared and faced bolt lug surfaces in the action. This is another of those jobs that takes longer to set up and clean up than it actually takes to do. First, take the bolt apart. The **Kleinendorst Remington Bolt Disassembly Tool** hooks the cocking piece and holds it back so you can unscrew the entire firing pin assembly. With it out, dab a bit of **Brownells 320 Grit, Silicon Carbide Abrasive Compound** on the Bolt Lug faces inside the action. Slide the bolt back into the action and close it. Install the **Brownells Bolt Lapping Tool** threaded sleeve and plunger into the action's barrel threads following the supplied instructions.



*The Bolt Lapping Tool delivers constant pressure against the bolt to keep it in place during lapping.*

The spring-loaded plunger keeps constant pressure against the bolt face while you rotate the bolt handle. That pressure transfers to the lugs and their mating surfaces in the action. With lapping compound between the two, they'll quickly end up perfectly fitted to each other. Run the bolt handle up and down 10 times, take the Lapping Tool out, pull the bolt out of the action, clean the lugs and check all of the surfaces. The pictures nearby show that these were slightly different â

œheights.âœ• One lug is bright while the other barely touched. Thatâœ™s why we lap.



*The lug on the left is almost fully lapped, note the lug on the right still shows most of its bluing.*

Once both show at least 80% contact, youâœ™re done. Take everything apart, clean thoroughly to get rid of all lapping compound and metal residue.



*Both lugs are fully lapped giving 100% contact; 80% would do.*

Put the gun back together, check the bore sighting of the scope and letâœ™s finally head to the range one more time. And, then, back to town to get the ammo I forgot to bring. Between vacations, computer crashes, and sheer procrastination, the only day we had to shoot was perfect âœ“ for one of those dripping wet scope photos that show how tough brand âœœXâœ• is. 50 degrees, drizzle with gusting winds and haze that made the 100-yard target look like a fuzzy spot.



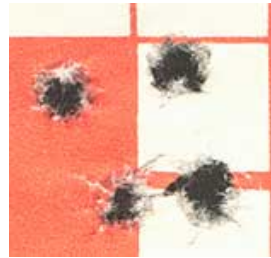
*Drizzle on the scope lens isnâœ™t much fun.*



*There really is a target down there.*

>But, even in this âœœbleep,âœ• Marc and I ended up the happiest weâœ™ve been with any of our shooting sessions.

After three or four groups looking for that “money” group, Marc came up with the right word. Consistency.



*This really is five rounds, the lower right shot is a double hole that tore slightly onto the left side.*

We got that nice, 1/2”, five-shot group, but none of the groups had those unexplained flyers, an inch away from the rest, that we experienced when we first started shooting the gun. The Cloverleaf 80 grainers had developed into the gun’s favorites, but I was able to shoot a decent, 1” group using the 100-grain Cloverleaf, without trying particularly hard. We found that three-shot groups were easy, fives were hard.



*One of several great little 3-shot groups.*

Although Marc kept cursing the thin, sporter barrel, by the end of the session, even he was grudgingly admiring our little, practical hunting rifle. There you have it. From a bolt together shooting 1-1/4” and 1-3/4” groups, which really isn’t terrible, to consistent 5-shot groups well under an inch, with a 1/2 inch for show-off purposes.

Hope you’ve learned as much, and had half as much fun as I have through the project.

### **How To Build Your Own Remington 700 - Part III**



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