The 10/22 Companion

How to

Operate

Troubleshoot

Maintain

and

Improve

Your Ruger 10/22

By Bob Newton

The 10/22 Companion

How to

Operate

Troubleshoot

Maintain

and

Improve

Your Ruger 10/22

A Companion Publication

The 10/22 Companion

Dear Reader,

Why buy this book? Nearly everything about almost anything can be found for free on the web today, with videos. I wrote this book because:

- All the important knowledge about how your 10/22 works and how to work on it is here in one place. You don't have to be online to use it and you don't have to search for it.
- There are buyer's guides available that review or list the dozens of barrels, stocks and action upgrades available. There are so many products, and the decision about which is best for you is so personal, that I can't presume to give an opinion on each one. So this is not a "buyer's guide". But I will discuss various products I have encountered, especially cleaning tools and products, and explain which I use, and how and why I use them.
- The explanations, procedures, advice and tips in this book are derived directly from my hands-on experience teaching 10/22 owners how to work on their rifles and helping hundreds of shooters of all ages and experience levels at Appleseed and club events. This book presents the information almost exactly as I teach it in my 10/22 Maintenance Clinics, so you will find it easy to use and complete.

This book will generally avoid telling you what to buy, but it will show you how to install it, and how to take care of it. Where I do express an opinion on a product, it is based on personal experience and I explain my reasoning. I have no connection with any company named in this book other than being an ordinary customer of some of them. All cost estimates are as of summer, 2014.

While everything in this book has worked for me and my students, you are in control of your 10/22 and I am not looking over your bench. **Everything you do with your rifle or to it is solely your responsibility.**

My goal is for you to thoroughly understand your 10/22 so that you can enjoy it more.

Table of Contents

Introduction

The Ruger 10/22 is a .22LR caliber, box-magazine fed, blowback action, semi-automatic rifle made by Sturm, Ruger & Co., in Newport, New Hampshire. It was first sold in 1964. The 10/22 is an excellent example of firearm design: easy to operate, quite accurate, reliable, light, inexpensive to build - and therefore to buy – and simple to maintain including disassembly and reassembly. Over the years, Ruger has made a wide variety of 10/22 models with different finishes, barrel lengths and styles, and stocks. It is no wonder that over five million 10/22s have been sold by Ruger in the rifle's first fifty years. Properly maintained, a 10/22 should last you millions of rounds over many decades of use.

This guide provides step-by-step instructions for maintaining your 10/22. It also provides suggestions for ways to customize the 10/22 to improve its performance and ergonomics. To see how creatively one can customize the 10/22, browse through the Ultimate 10/22 section of the rimfirecentral.com discussion forum on the Web (see Chapter 7 for the addresses of internet resources).

This guide is intended for the new or casual 10/22 owner, whether you are new to guns in general or only to the 10/22. You may have owned your rifle for decades yet never had it apart. The guide covers the basic procedures, and some handy tips, for operating, maintaining and customizing your rifle. It does not cover such advanced topics as bedding the action, altering the bolt, or modifying the original trigger parts, which require a serious amount of gunsmithing knowledge and special tools. Doing some of these procedures improperly can make your rifle unsafe or even illegal. Perhaps a future companion book may cover these. For the vast majority of owners, proper maintenance and, if desired, tuning the rifle with easily installable aftermarket parts, will keep our 10/22s reliable, accurate, and fun to shoot.

This guide does not cover most of the very basic, legalistic, operating and safety information that is contained in the Ruger 10/22 Instruction Manual which is supplied with every new rifle. The Ruger manual also includes exploded drawings of all the parts in the rifle, with official OEM part numbers if you need any replacements. I assume you have an official Ruger Instruction Manual, and I ask you to read it thoroughly and understand it. If you do not have one, you can download one for free from the Customer Service section of www.ruger.com or contact Ruger at:

Sturm, Ruger & Co., Inc.
Customer Service Department
411 Sunapee Street
Newport, NH 03773

Telephone: 603-865-2442 / Fax: 603-863-6165
(Monday through Friday 8:00am - 5:00pm ET)

Chapter 1 An Insider's Tour of the 10/22

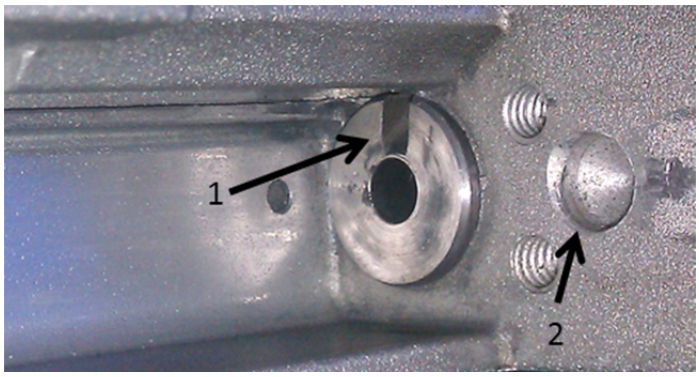
How exactly does your 10/22 work? Why does it have 52 working parts (excluding the sights, barrel band, and receiver filler screws)? What does each part do, and why is it designed as it is? This section explains the function of each part and how they all work together to make the 10/22 such a good rifle.

The action of the 10/22 is made of up four major assemblies:

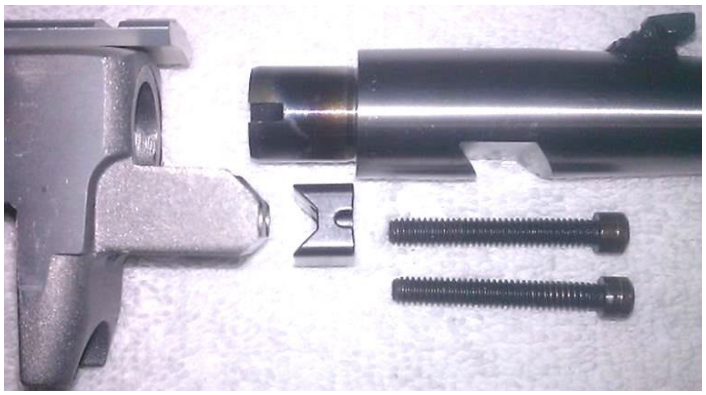
- The barrel and receiver
- The bolt
- The trigger group
- The magazine

The Barrel and Receiver

The barrel, of course, is not a moving part. But one feature of the barrel is important to proper functioning of the action: the cutout in the side of the shank in which the extractor fits when the bolt is closed. It is critical that the extractor fit entirely inside the cutout and move freely without dragging on either the top or bottom edge.

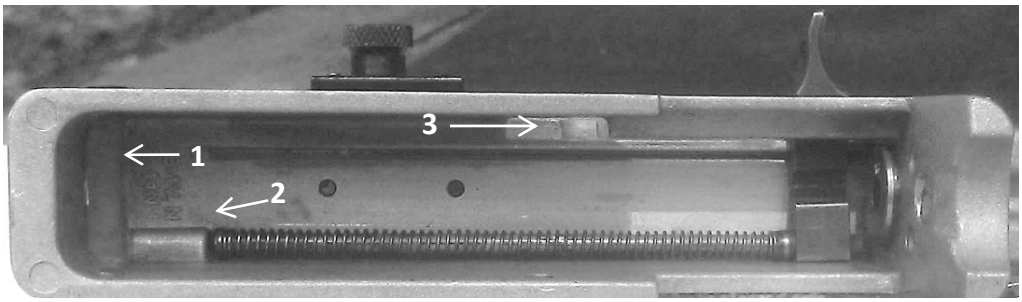


1. Extractor cutout in barrel
2. Recess for magazine screw holds mag in place



Receiver, barrel, barrel retainer block, screws

The receiver is made of cast aluminum alloy. Inside it are three important features, shown in the photo below:



1. Bolt stop pin
2. Guide rod pocket
3. Bolt guide shelf

The bolt stop pin fits across the rear of the receiver. It prevents the bolt from moving too far back and falling off the bolt guide shelf. This pin must be removed before you remove the bolt when cleaning or servicing the action.

The guide rod pocket supports the bolt guide rod and keeps it in place along the receiver. It is a machined, conical well in the casting which fits the pointed rear tip of the guide rod. If you experience a problem with the bolt not moving smoothly, or a scraping or zinging noise when cycling the bolt, it may be due to the guide rod not seating properly in the pocket because of improper assembly by the user.

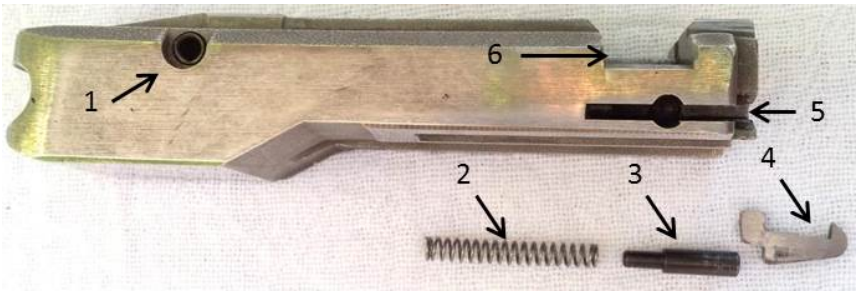
The bolt guide shelf on the right side below the ejection port supports the bolt against gravity. Only one is needed – the bolt fits tightly enough in the receiver that it cannot cant and drop out. Having only the one guide shelf rather than two reduces friction and cost. When the action is assembled and the bolt is rearward, the bolt is also supported by the hammer.

The Bolt and Guide Rod

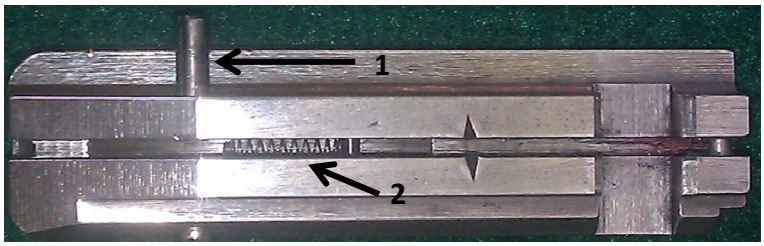
The bolt assembly contains 8 parts:

Bolt	Extractor plunger spring
Firing pin	Extractor plunger
Firing pin stop pin	Extractor
Firing pin return spring	Bolt guide rod/spring/handle assembly

The photos below show how they all fit together:



1. Firing pin stop pin
2. Extractor spring
3. Extractor plunger
4. Extractor
5. Slot for extractor assembly
6. Slot for bolt handle



Bolt detail showing:
1. Firing pin stop pin partially driven out
2. Firing pin return spring

Firing pin showing:
1. Rear edge, which hammer hits
2. Hole for stop pin to prevent overtravel
3. Spur engages return spring
4. Tip contacts case rim to ignite primer

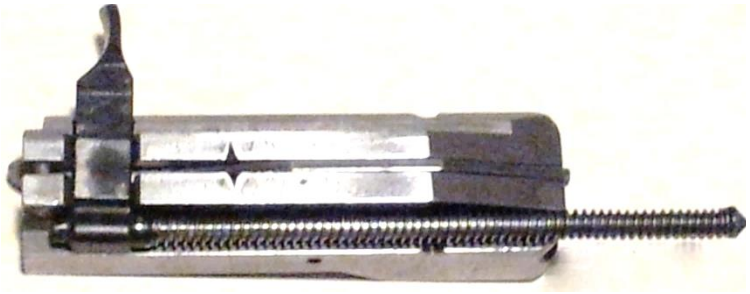
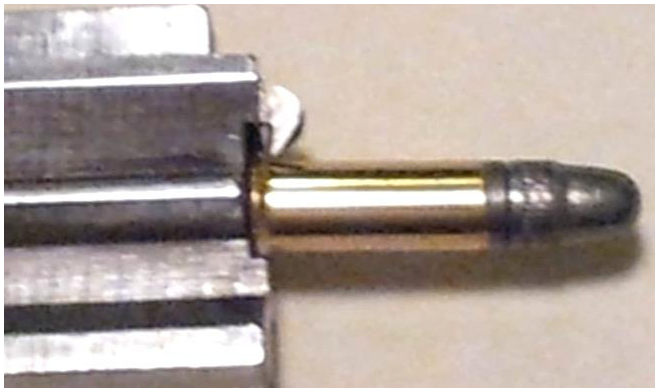


Photo showing how bolt handle fits into slot across the top of the bolt.

The extractor has two functions: (1) it pulls an unfired round out of the chamber when you cycle the bolt manually; and (2) it holds the (fired or unfired) case in position on the bolt until the case hits the feed lips on the magazine or the ejector – the case then pivots around the extractor to fly to the side, out the ejection port. The photo below shows how the extractor holds the round:



The Trigger Group

The 10/22's trigger group is a complete module, contained in a strong one-piece housing that connects to the receiver with two pins. Early 10/22s had a cast aluminum housing; later ones a polymer housing. While some people see the change to plastic as a drop in quality, in fact the polymer housing is actually made to finer tolerances than the casting was. (Some aftermarket parts makers recommend using the polymer housings because they are more consistent in dimensions.) Everything is pinned in place, so you need only a small punch to work on all the parts (except the safety, which requires some other tools). There is a lot of space inside the trigger group, and the parts fit loosely enough that you can neglect them for a long time and they will still be reliable.

Trigger Assembly

The trigger assembly consists of six parts:

Parts of the trigger assembly:

1. **Trigger blade**
2. **Disconnector pin**
3. **Disconnector**
4. **Sear spring**
5. **Trigger pivot pin (shown with a temporary "cheater pin" used in re-assembly)**
6. **Sear**

The interaction of the trigger blade, disconnector and sear is what makes the rifle fire in semiautomatic mode only. As shown in the photos below, the disconnector is the part that moves the sear.

Ready to fire. Rear edge of the sear is engaged in disconnector slot so that it can be pulled upward when trigger blade is pressed. The sear rotates around the pivot pin, and the front edge of the sear drops away from its hook on the hammer.

After the shot, the hammer presses down on the disconnector, which disengages from the sear. The sear spring, located behind the pivot pin, pops the rear edge of the sear below the slot. It also pushes the front of the sear up against the hammer, so that the sear will engage in the hammer's sear hook.

Separate from the trigger assembly is the trigger return plunger with its spring. These sit in a hole inside the rear of the trigger guard. The narrow end of the plunger fits inside the spring.

Arrow shows trigger return plunger

Trigger, return plunger and spring in relative positions

Hammer Assembly

The hammer assembly consists of two component groups:

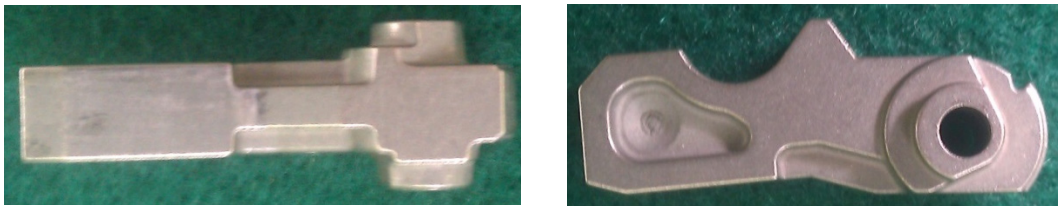
- Hammer, bushings (some hammers are one piece), and hammer pin
- Hammer strut, spring, and washer (also called "C-clip").

The hammer group fits in the middle of the trigger housing, above the trigger assembly.

The hammer strut assembly fits in a hole in the rear of the housing. The rounded end of the strut fits into the groove in the back of the hammer.

Also, fitted over the right-side hammer bushing, is the bolt lock spring. This has no function related to the hammer, but must be fitted correctly when removing and installing the hammer assembly.

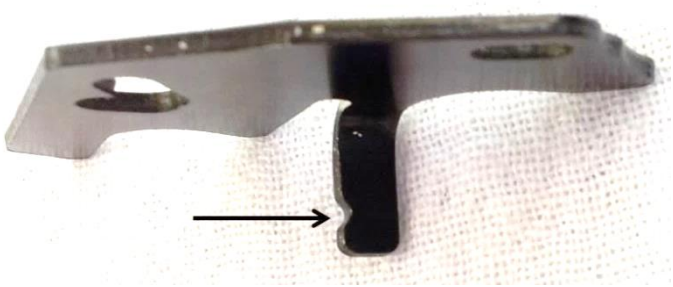
1. Hammer with bushings
2. Hammer strut assembly
3. Hammer pivot pin
4. Bolt lock spring



One-piece hammer does not require bushings.

Bolt Lock, Ejector, and Magazine Catch

Ejector, ejector pin, and bolt lock.



Notch in crossways leg of bolt lock for spring

The bolt lock is a stamped steel part that fits against the left side of the housing. It is held in place with two pins. When the lock is raised, the bolt pushes against it and is prevented from moving forward.

The photos below show how the bolt lock works (I painted it white for the photos). The bolt lock pivots and moves up and down on the lower pin (which is shared with the magazine release) as you press the blade that protrudes between the trigger guard and mag release lever. The upper pin (shared with the ejector) engages the heart-shaped cutout at the top of the bolt lock to hold the lock in the raised or lowered position.

The bolt lock is spring loaded, pushed down by its spring which fits on the right-side hammer bushing. See the spring in the hammer assembly photo above.

Bolt lock in lowered position, allowing bolt to glide over it. Pin is in front lobe of cutout. For this photo, the bolt lock is painted white, and the ejector removed. To lock bolt, pull it back, press the blade in and ease the bolt forward. Pressure from the bolt holds the lock in place.

Bolt lock in raised position. Pin is in rear lobe of cutout. To lower it, pull the bolt back and press the forward part of the blade. The lock rises so that the point clears the pin, which then slides up into the front lobe of the cutout.

The ejector (circled above) is held by the ejector pin and sits in the slot at the front left of the trigger group housing. Its function is to hit the left side of an extracted case (whether fired or manually

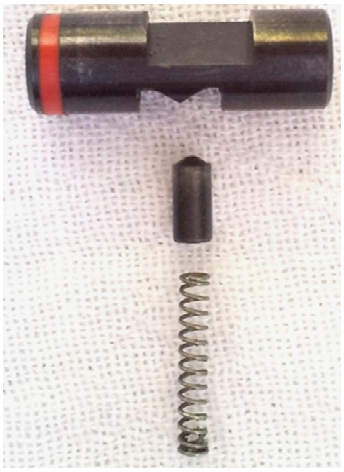
extracted) to spin the case out the ejection port if the magazine is not in place. If the magazine is in place, the ejector is behind it and the magazine feed lips act as the primary ejector. It is critical, when installing the trigger group into the receiver, that the ejector is properly seated in its slot or the bolt will not function correctly.

Bolt is locked open, magazine is out. Circle shows ejector protruding into recess to kick out round. Arrow shows magazine catch.

The magazine catch is shown in the photo above, just below the bolt. It consists of the catch and its spring. It fits into the front of the trigger group housing. The magazine release fits in from below, and pivots on the pin it shares with the bolt lock. Its upper arm is trapped between the front of the housing and the "mushroom" head at the rear of the catch. When you press in or push forward on the magazine release, the upper arm pivots rearward, pulling the catch into the trigger group to release the magazine.

1. Magazine catch and spring
2. Magazine release
3. Magazine release/bolt lock pin
4. Trigger group housing

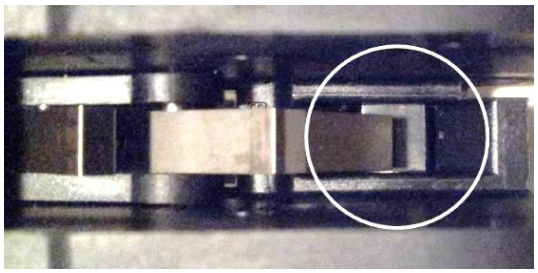
The Safety



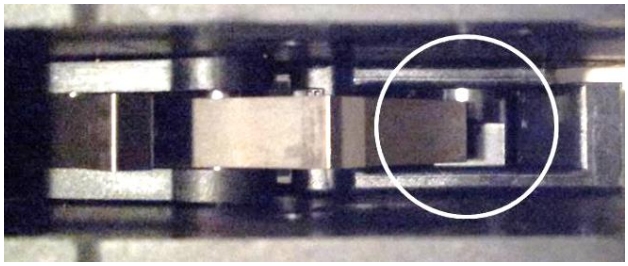
Safety, with detent plunger and spring.

The safety sits in the bottom front of the trigger group housing. When the safety is pushed to the right, for the SAFE position, the round section of its upper barrel sits under the front leg of the sear. This prevents the sear from descending so that it cannot disengage from the sear hook on the hammer. You can feel that the trigger blade will not move beyond this point.

When the safety is pushed to the left for the FIRE position, the flat cutout sits under the sear's front leg. This allows the sear to descend when the trigger blade is pressed.



Flat cutout of safety is under sear in FIRE position



Sear sits partially on round part of safety in SAFE

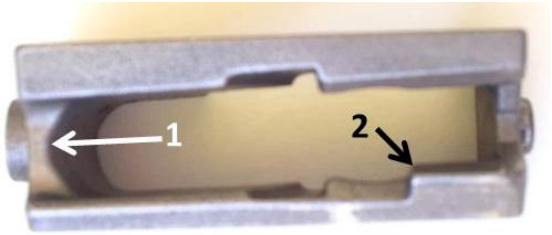
The safety is asymmetrical. It cannot simply be reversed for left-handed operation. If you want a left-handed safety, you must buy an aftermarket one. As of this writing I am aware of three makers of aftermarket safeties for the 10/22:

- Power Custom
- Tactical Innovations
- Volquartsen

Note: Some aftermarket safeties have extra-large safety buttons that must be removed each time you remove the action from the stock. The buttons are fastened to the body of the safety with screws.

The Magazine

The 10-round BX-1 magazine that comes standard with the 10/22 is another example of the fine engineering that Ruger put into the design of this rifle. The rotary format allows the rifle to hold ten rounds while maintaining a flush fit with the stock. It also allows all ten rounds to be loaded while minimizing the effort to compress the spring, unlike the springs on stick magazines which become stiffer as they are filled. The magazine sits high enough in the receiver that rounds are presented at a very flat angle to the chamber which is good for reliability. The magazine throat contains the feed ramp at the front, eliminating the need for a feed ramp on the barrel, and an ejector at the rear.



1. **Feed ramp integrated into magazine throat.**
2. **This step on the throat acts as the primary ejector, kicking the case out to the side while the bolt is still moving rearwards for reliable ejection.**

View from rear with cap removed. When empty with the spring tensioned, the long vane stops inside the throat nearly straight up. As you add rounds, the rotor turns counter-clockwise.

When filled, the long vane stops on the throat at the 1:00 position.

The magazine is held in place by the protruding screw head at the front, which seats into a depression in the receiver (shown in photo on page 2) and by the nub on the magazine cap nut, which sits in a hole in the center of the magazine catch (shown in photo on page 8). This fore-and-aft seating allows the sides of the magazine to float in the stock so that the magazine can drop free when the release is actuated. You should not need to pull the magazine out of the stock. If yours sticks, you can sand the inside of the stock where the mag sits to loosen the fit for all your magazines. Do this evenly on both sides; and by hand, with fine sandpaper wrapped on a small wood block or popsicle stick. Do not use a power tool for this, go slowly, and test fit often to avoid making it too loose. It only takes a few thousandths of an inch.

One thing the 10/22 magazine does not have is an external follower that would actuate a last-round hold-open feature, which most other rifles have. After you have fired the last shot, the bolt will not lock back – this is normal. There is a (rather expensive) aftermarket bolt lock and bolt combination you can buy that provides a hold-open feature.

The Ruger BX-25 25-round magazine is discussed in Chapter 5, Task 11B. Aftermarket 25-round magazines are not covered here. Many owners report questionable reliability in feeding and ejection with them.

What happens when you operate your 10/22

1. You fill a magazine with rounds. As you press in each round, the drum rotates, winding the spring. Under spring pressure the vane on the drum pushes the latest loaded round up between the feed lips. The narrow lips at the rear of the magazine hold the round in place.
2. We will assume the bolt is closed. You load the magazine into its well in the rifle. The mag slides against the beveled face of the magazine catch pushing the catch back against spring pressure; when the nub in the magazine cap nut slips into the hole in the center of the catch, the catch springs forward to engage it, pressing the magazine screw into a recess in the front of the magazine well. The magazine is now locked in place, supported at the front and rear. The center rib on the bottom of the bolt presses down on the top cartridge.
3. You hold the bolt handle on the bolt guide rod and pull the bolt back until it hits the bolt stop pin. The rear of the bolt pushes the hammer back, gliding over the hammer. If the hammer was uncocked, it now rotates rearward, pushing the hammer strut into its hole in the rear of the trigger housing against the pressure of the hammer spring. As the hammer rotates, its round bottom glides over the edge of the sear until the hammer's sear hook passes the sear. The sear is being pressed upward by pressure from the sear spring so that it holds the hammer in place after the hammer has rotated forward a tiny bit as the sear settles into the sear hook on the hammer. The magazine spring pushes the cartridge up so it is now lying in front of the headspace recess in the bolt face.
4. You release the bolt, allowing it to spring forward propelled by the bolt spring. The center rib on the bottom of the bolt strips the cartridge from the magazine. The cartridge slides up into the headspace recess and is pushed forward into the chamber. The round tip of the extractor slides over the case head into its slot in the barrel shank, until the bolt is fully forward. When the tip of the extractor is forward of the case lip, the extractor spring and plunger push it in toward the chamber and the sharp hook on the extractor engages the case lip.

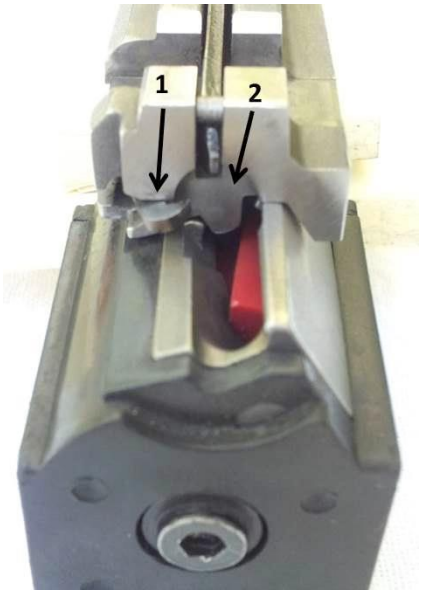
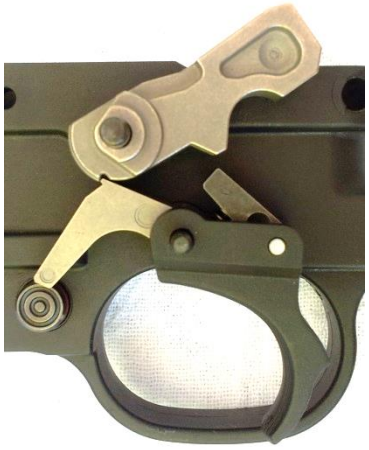


Photo shows bolt gliding over magazine.

1. **Rounded front of extractor slides around case rim, then the hook catches the rim**
2. **Arrow points to center rib on bolt bottom which strips the cartridge from the mag**

5. You are in position and put your sights on the target. You press the safety to the left. You hear and feel the click as the safety plunger, which was in the left slot of the safety's bottom, is depressed by a bevel against pressure from its spring and then pushed up by the spring into the right slot of the safety, stopping the leftward travel. As the safety slides left, the top edge glides along the bottom of the sear's front leg until the cutout on the right side of the safety's top edge appears under the sear.

The cutout will allow the sear to move downward when the trigger is pressed and the safety is on FIRE. When the safety is on SAFE, the full-height section of the safety prevents the sear's leg from moving down.



After Step 5: Ready to fire.

1. **Hammer cocked, held by sear engaged in sear hook.**
2. **Trigger is forward.**
3. **Sear is engaged in disconnector slot. Note the angle between sear and disconnector.**
3. **Disconnector and pivot pins are level.**
4. **Note that sear's front leg is even with top of safety. Only the cutout allows it to descend.**
5. **As sear rotates, it moves both forward and down. This pushes hammer back against spring pressure, creating the pull weight.**

6. You press the trigger. It rotates around the trigger pivot pin. The top rear of the trigger pushes upwards on the disconnector via its pin, and the disconnector pulls the rear leg of the sear upward. The sear rotates on the trigger pivot pin so that its front moves downward. Because of the shape of the hammer's sear hook, the sear first pushes the hammer so that it rotates slightly rearward – this is where most of the weight and creep of the trigger pull come from. Once the sear clears the hook, the hammer is driven forward by its strut. The hammer face slams into the rear of the firing pin, which was slightly protruding from the rear of the bolt.

   As the firing pin is pushed forward, the front tip of the pin enters the headspace recess, where it crushes the case rim. This ignites the primer, which ignites the powder. Forward travel of the firing pin is stopped when the rear edge of a hole in it contacts the firing pin stop pin.

After Step 6, firing the shot:

1. **Hammer rotated forward**
2. **Sear below hammer**
3. **Sear and disconnector still engage**
4. **Trigger is back, disconnector pin is above pivot pin**
5. **Sear is below top of safety**

7. Rapidly expanding combustion gases in the cartridge case act equally in all directions. The bullet is pushed out of the barrel toward the target. The case head is pushed with equal force, but it moves much more slowly because the force is resisted by the combined inertia of the heavy bolt and the force of the recoil spring. This is why most of the gas pressure is released out the muzzle before the bolt can move away from the breech face. The gas blows the case rearward out of the chamber, pushing the bolt back. As the bolt moves back it cocks the hammer as in Step 3, this time powered by the gas. As the hammer rotates back, the firing pin return spring pushes the firing pin back. The case rim hits the magazine's feed lips; the case then pivots around the extractor, and is thrown sideways out the ejection port.

   (Note: The extractor does very little in this process. The rifle will eject fired rounds properly even without an extractor. But the extractor is necessary for removing an unfired round from the chamber. Similarly, the ejector sits behind the magazine feed lip and has no role in ejecting a fired case. The ejector's role is to spin an unfired round out sideways when the bolt is cycled if there is no magazine in place.)

   As the bolt clears the magazine, the magazine drum rotates to present the next round.

8. The bolt is pushed forward by the handle on the guide rod, powered by the recoil spring, repeating Step 4.

9. When the bolt moved back in Step 7, the spur on the rear of the hammer pushed down on the front top of the disconnector. The disconnector rotated on its pin, releasing the back leg of the sear out of its slot. As the bolt comes forward, the hammer rotates up until it is caught by the sear; this moves the spur away from the disconnector. As you hold the trigger back (good follow-through), the disconnector pivot pin is still raised above the trigger pivot pin, such that the back of the sear is not seated in its slot in the disconnector. The sear cannot be rotated again until its back leg is seated in the disconnector. This is what makes the 10/22 a semi-automatic rifle, as it can only fire once for each press of the trigger.

After Step 9: Follow-through, trigger held back

1. **Bolt is forward again. Hammer is in cocked position Sear was pushed up by sear spring to engage the sear hook in hammer to prevent automatic firing**
2. **Sear is out of disconnector slot, cannot rotate**
3. **Sear and disconnector are almost parallel**
4. **Disconnector pin higher than pivot pin**

10. You release the trigger blade. It is pushed forward by the trigger return plunger (powered by its spring inside the trigger guard). As the trigger blade rotates forward, the rear of the disconnector rotates downward and forward, pushed by the disconnector spring. The rear leg of the sear, which is held in place by the hammer, slips into its slot in the disconnector – you feel and hear the click. Now the trigger is reset, ready to repeat Step 6 for the next shot.

11. When you are done shooting, you press the magazine release (up or forward, depending on the type). The release pivots on its pin so that its top pushes the magazine catch rearward until the catch disengages from the magazine cap nut, and the magazine drops out of the stock.
12. You then pull the bolt back so that the extractor can pull out any round still in the chamber, and so it will cock the hammer so that the safety can engage. The safety will not fully engage unless the hammer is cocked, because the sear's front leg is still in the cutout. You press the safety to SAFE.
13. You hold the bolt back and press the bolt lock blade back. You hold the blade in and allow the bolt to creep forward until it presses against the bolt lock above the trigger housing, pushing the bolt lock forward so that the rear lobe of the cutout engages the ejector pin. The bolt is now locked back. You release the bolt lock blade and the bolt lock spring pushes the front of the bolt lock down.
14. To close the bolt, you pull the bolt all the way back and press the front edge of the bolt lock blade upward. The bolt lock rotates rearward around the mag release pin. The cutout in the bolt lock moves upward and back, so that the point of the cutout clears the ejector pin. As you release the blade, the bolt lock spring pushes down and the front lobe of the cutout engages the ejector pin. This allows the rear of the bolt lock to descend below the trigger group housing so that the bolt can move forward when you release the bolt handle.

It's that simple.

Special Notes about the 10/22 Takedown Model

The Takedown model has very few differences in its operating parts from the fixed-barrel models. The inner receiver, bolt and guide rod, trigger group, and magazines are all the same. All of the care instructions and customization products for these components apply equally to the Takedown. Obviously the barrel is different; this has some consequences:

- It is easy to clean the chamber and bore from the breech end – no need for a muzzle protector.
- **You must lock the bolt back before installing or removing the barrel.** Twisting the barrel with the extractor in its slot will bend or break the extractor. I have seen broken extractors from owners' failing to remember this.
- Some Takedown owners report inconsistent accuracy after installing the barrel. Usually that is due to improper tightening of the barrel adjustment ring. You must follow the instructions in your Ruger owner's manual for adjusting the ring. It is important to cycle the bolt a few times, allowing the bolt to spring forward with its spring's full force, to "bed in" the barrel every time your re-assemble the rifle, before shooting. Do this with no magazine in the rifle to avoid an unpleasant surprise.
- Beginning in 2015 there is an increasing variety of aftermarket stocks available for the Takedown model. Stocks are available in a variety of designs from AGP Arms, Adaptive Tactical, Altamont, Boyds Gunstocks, Hogue, and Tacstar. There is also a custom specialist who converts standard 10/22 stocks for the Takedown (http://www.1022td-woodstocks.com). This list is likely to grow.
- There are a few aftermarket barrels available for the Takedown, from such makers as Beyer, McGowen, Tactical Solutions, and Volquartsen. Most are rather expensive, in the $300 range.
- You can get a Takedown barrel accurized (see Chapter 10). Connecticut Precision Chambering (www.ct-precision.com) provides a "Tune-up" service which shortens the chamber to semi-auto match length, polishes the chamber, laps the bore, and cuts the muzzle crown. This is a less complete modification than the one which can be done on standard 10/22 barrels.

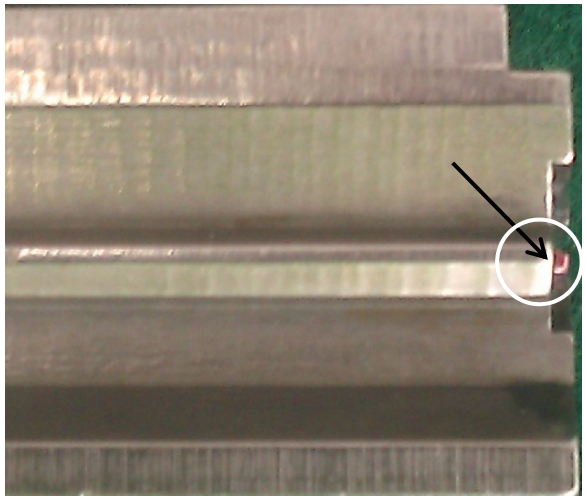
Chapter 2 Operating Tips

The 10/22 is simple to operate, but there are a few common things that shooters new to it should keep in mind:

- **Don't be gentle inserting the magazine.** Insert it decisively, making sure it clicks into place. You can't hurt it. If the mag is not fully inserted, the rounds will not feed and it could drop out onto the ground while you shoot. You do, of course, have to ensure you have the magazine aligned properly; if canted, it will bind.

- **The magazine faces down to remove it.** Don't hold the rifle sideways or upside-down and try to pry the magazine out with fingers. Hold it as you do when shooting, with the sights on top. Let the mag fall free into your hand or onto the bench. Gravity is your friend. If the magazine does not fall out freely, make sure it is clean and that there is nothing blocking the mag well. If the magazine continues to stick, you may need to widen the mag well in the stock slightly with some sandpaper as described in Chapter 1.

- **You can dry-fire the 10/22**: The firing pin is blocked from protruding beyond the bolt face and it cannot contact the breech face of the barrel (see photo below). If the breech in your 10/22 shows marks from the firing pin, the bolt or firing pin is defective. Dry fire is a valuable practice method. World-class competitive shooters in their practice sessions take hundreds of dry-fire shots for every live round they fire. You can dry-fire the 10/22 without a magazine.



Arrow point shows firing pin (red, in circle) fully forward. Firing pin does not go beyond the bolt face.

- **When shooting, hold the rifle firmly into the pocket between your shoulder and collarbone.** If you do not hold the buttstock solidly against your body, the rifle will move under recoil. This will cause inaccurate shots. It will also cause failures to eject as the fired case gets caught in the backward-moving receiver instead of being thrown freely to the side.

- **To operate the OEM bolt lock, use the 4-step method. The bolt does not automatically lock open when the magazine is empty. This is normal.** Some other rifles with vertical stack magazines have a tab or button on the magazine that activates the bolt lock. Ruger's bolt and rotary magazine design cannot do that. The four steps are:

    1. Bolt Back: pull the bolt handle back with index finger or thumb.
    2. Blade In: Press the bolt lock lever (a scalloped or triangular "blade" on the left side between the trigger guard and the magazine release) diagonally in and up towards the trigger guard.
    3. Bolt Forward: pull the bolt handle back, then:
       (a) if locking the bolt back, gently ease it forward until it catches on the bolt lock; or
       (b) if closing the bolt, release it to spring forward. Don't "ride the bolt" forward with your finger, as this can cause misfeeds.
    4. Blade Out: Release the bolt lock lever; it is spring loaded and will lower automatically.

    To lock the bolt back: Do the steps in this order: **1-2-3-4**. After Step 3, holding the blade in, allow the bolt to creep forward. As you feel it catch the raised bolt lock, release the blade.

    To release the bolt: Do the steps in this order: **1-2-4-3**. When you release the blade with the bolt fully back, the bolt lock descends below the bolt, allowing the bolt to pass over it.

You can operate the bolt one-handed with the right hand if you hook your thumb over the bolt handle, allowing your fingers to curl under the stock; you can then operate the blade with one of your fingers. If you have iron sights, you can even do it left-handed.

Right-handed bolt operation

Finger presses lever while thumb holds bolt

Left-handed bolt operation.

The official Instruction Manual gives a different procedure: to press the blade back to lock the bolt, and to press it up to release it. I find the “up” and “back” instructions a little confusing, as the blade actually moves diagonally, and it’s hard to be precise about the exact direction. The key point to remember is that you want to press the blade in all the way so that it goes up as well as back. It also helps if you press the lower-rear part of the blade to lock the bolt, and the upper-front part of the blade to release it. I find it is easier to use the 4-step method.

Press at arrow for "back" to raise lock
Upper pin engages rear lobe of cutout

Press at arrow for “up” to lower lock
Upper pin is now in front lobe

- **“Fouling” Shots After Cleaning:** If you are shooting for accuracy, you will want to take a few shots (5-10) after a thorough barrel cleaning or your first shots will be “fliers” away from your point of aim. The reason for this is that bullet lube coats the bore beginning with the first shot, but the first shot will go through a dry barrel – an inconsistent condition. It’s like using a new cast-iron frying pan compared to a well-seasoned one. You want to “season” the barrel before shooting for score. Also be sure that your bore is seasoned when zeroing your sights or scope.

  Target shooters talk about a “window of accuracy” after cleaning and firing some fouling shots. With a consistent, light coat of bullet lube in the bore, the rifle is accurate, but the accumulation of lube and soot increases to some point where accuracy falls off. Then it’s time to clean again. Depending on your standard of accuracy, the window may be 50 shots, or 500.

Making the rifle safe

When you are done shooting for a time and want to put the rifle down, transport it from the firing line, or pack it up, you should clear it and make it safe, to ensure that it is empty the next time you pick it up.

A 10/22 can fire without a magazine in it, so you want to follow this specific procedure to make it safe:

1. KEEPING THE MUZZLE IN A SAFE DIRECTION, push the safety to SAFE. If it does not go all the way to the right, do the next two steps and then repeat this one. The 10/22 safety will only go all the way to the SAFE position if the hammer is cocked before pressing it. Leaving the safety in the half-way position is not safe - the rifle can fire if you press the trigger with the safety halfway on.
2. Remove the magazine, if there is one in the well.

3. Pull the bolt back to eject any round in the chamber, and then lock the bolt back. Push the safety to SAFE again to ensure it is all the way on. You removed the magazine first so that if the bolt should slip forward, it will not chamber another round.
4. Check the chamber to ensure there is no round in it.
5. It is a good practice to insert a chamber flag (also known as an ECI – empty chamber indicator). This allows you and others nearby to quickly recognize that the rifle is in a safe condition, and prevents anyone from accidentally inserting a round. Nearly all competition events require the use of chamber flags to ensure that all rifles are safe between stages or during transport to and from the firing line. The post of the chamber flag should go into the chamber, not merely lie in the receiver. Keep your chamber flag scrupulously clean so it does not scratch the chamber.

   Also, keep your bolt locked back when using a chamber flag. If the bolt slams forward on the flag, it could break the post off in the barrel. Then you'll have to push the broken post out with a cleaning rod before you can shoot. The impact can also cause the extractor to be pushed out of the bolt and lost.

New and used chamber flags. You can bend the post so it goes more easily into the chamber.

Flag incorrectly installed. There could be a round in front of the post.

Flag correctly installed.

Chapter 3 Ammunition for the 10/22

Types of .22 Rimfire Ammunition

Your 10/22 is made to shoot only one type of .22 caliber ammunition: the .22 LR (stands for Long Rifle) cartridge.

There are five different cartridges in the family of .22 caliber rimfire ammunition: .22 Short, .22 Long, .22 Long Rifle, .22 WRF (stands for Winchester Rim Fire) and .22 WMR (stands for Winchester Magnum Rimfire). Only the .22LR is suitable for your 10/22. The other four kinds are unsafe in your 10/22. The first two are too weak to properly cycle your semiautomatic action, and may even leave the bullet stuck in the barrel, which is extremely dangerous. Fortunately, they do not fit properly in your rifle's magazine and would probably fail to feed into the chamber - but don't try to use them anyway. The .22 WRF and .22 WRM are too long to fit in your rifle's magazine or chamber and will not fire - which is good, because they are too powerful for your 10/22 and would damage your rifle and possibly injure someone if they did.

Types of .22LR Ammunition

Within the .22LR cartridge group, there are four types of ammo, distinguished by their velocity (which is a direct result of the power of their powder charge and the weight of the bullet).

- Standard velocity ammo has a muzzle velocity of between 1040 and 1100 feet per second (fps). It is usually the most accurate, especially in the expensive match grades (brands such as Eley, Lapua, RWS, SK and Wolf).
- High velocity ammo typically has a muzzle velocity between 1100 and 1300 fps. This velocity is supersonic, but the bullet slows down to below the sound barrier after about fifty yards; and crossing the sound barrier causes some turbulence that affects the accurate flight of the bullet. Supersonic ammo packs a punch and is often used for hunting. It is slightly less accurate than standard velocity. High velocity ammo is the most common type, probably because of marketing. Even when fired through a suppressor, the sonic boom of the bullet makes this ammo loud.
- The third type, hyper-velocity ammo, usually has a light, 36 or 32 grain weight bullet which because of its light weight has a muzzle velocity of 1300 fps or more. One brand of hyper-velocity is the CCI “Stinger”, with an advertised muzzle velocity of 1640 fps. This round has a longer case than normal ammo with a larger powder charge.
- Fourth, at the slow end of the velocity spectrum, "quiet" ammo is designed to shoot well under the sound barrier at 700-900 fps. Its reduced powder charge makes it shoot more quietly than standard ammo. "Quiet" ammo is often incorrectly called "subsonic" - standard velocity ammo is also subsonic. Because of its reduced power, quiet ammo will not work properly in a standard 10/22's semiautomatic action as it doesn't have enough force to cycle the bolt. Some owners have successfully modified their actions to shoot quiet ammo.

Quality Grades of Ammunition

There is also a distinction made based on quality. "Bulk ammo" is relatively inexpensive (under $.12 per round as of 2015) and often sold in large, 300-500 round boxes. "Match ammo" can cost $.25 per round or more – even $.50 per round for the highest quality brands such as Eley Tenex and Lapua Midas. The match-grade ammo is made with great care and tight quality control to be more consistent in every

respect, and therefore more accurate. But it costs much more to make. Unless you get involved in competitive target shooting, you don't need to spend the extra money for match ammo.

"Quality" in the bulk category is defined by reliability (percent of dud rounds) and by accuracy. The leading brands of bulk ammo are CCI and Federal. Remington and Winchester are considered by many shooters to be on the second tier of quality. I have found some Winchester rounds to shoot very well.

Which Ammunition is Best for You?

Your 10/22 from the factory will shoot standard velocity and high velocity ammo just fine. Within these types, selecting a specific manufacturer and brand is a mixture of objective analysis and personal opinion. The objective analysis includes such factors as the degree of accuracy you need, what cycles most reliably in your rifle, and what terminal ballistics performance you need for the sort of shooting you do as well as how accurate the ammo is on a given day.

High velocity ammo is often used for hunting or plinking, because it hits the target with higher energy and has a flatter trajectory over a given distance than standard velocity. Many small-game hunters also prefer hollow-point bullets which expand better in the target. Standard velocity ammo is generally more accurate because it never exceeds the speed of sound (1126 fps at 20°C). When a supersonic bullet slows down into subsonic speed, it undergoes a slight turbulence that can upset its trajectory. Most high velocity rounds cross the sound barrier at distances of 40-50 yards. If you shoot with a suppressor, you will want to stick with standard velocity ammunition to avoid the loud "crack" of the supersonic bullet.

The stock 10/22 tapered barrel is chambered to "Sporting" specifications (as defined by the Sporting Arms and Ammunition Institute, the official industry body that specifies the dimensions and pressures of firearms and ammunition). The "Sporting" specification is a looser fit than the "Match" specification chamber. It will reliably shoot nearly any ammunition. The tradeoff is in accuracy.

Many 10/22 owners install aftermarket barrels, or have their factory barrels modified, for improved accuracy. Most of these barrels have tighter chambers than the OEM factory standard 10/22. The tighter chamber ensures that the bullet is always perfectly aligned in the bore. But it is more sensitive to the length and design of the round, especially the shape of the bullet. My target 10/22s will not even feed certain brands of ammo (such as Armscor) which have "fat" noses, and are unreliable even with CCI Minimags when the chamber gets dirty. But they shoot CCI Standard Velocity (SV) and the match-grade brands with no problems.

A special note about CCI "Stinger" ammunition: Ruger has a special safety warning about using Stinger brand ammo in the 10/22 Target and 10/22 Tactical models. These models have a different barrel from the carbine and sporter models – it is made with a slightly tighter chamber for improved accuracy. Ruger's warning, on page 17 of the Instruction Manual, reads:

> "Stinger" cartridges have a longer case than 22 LR cartridges loaded to U.S. Industry specifications. They can stick in the tighter chambers of target rifles, including the Ruger 10/22 Target and Tactical rifles, which can result in a hazardous ruptured case and release of hot powder gasses and brass when fired.

There is no warning against using Stinger rounds in the standard, tapered carbine and sporter barrels. There is also a heavy taper barrel (known as the LVT or "Light Varmint Taper"), found on certain

Distributor Exclusive models. I believe this barrel has the same chamber as the Target model and therefore recommend against using Stingers in any heavy taper barreled 10/22.

The photo below shows seven different rounds for comparison. Notice the extra length of the Stinger case which limits its suitability to SAAMI “Sporting” specification chambers.

The accuracy you can get from your 10/22 depends to a great extent on which ammo suits your rifle best. A stock 10/22 carbine or Sporter should be able to shoot groups of no more than 1-1.5” at 50 yards, or 2-3 minutes of angle, with good quality ammunition. (One minute of angle equates to 1.047” at 100 yards.) A Target or Heavy Taper model should do slightly better. Customized 10/22s with aftermarket barrels and triggers using match-grade ammunition can consistently shoot groups of .50” or less at 50 yards.

Different types of ammunition perform differently in the same rifle. The main factors behind this reflect the quality of the ammo in terms of how consistent it is from round to round with respect to:

- weight of the powder charge
- bullet weight
- balance of the bullet (think of an unbalanced car wheel spinning)
- surface of the bullet
- fit of the cartridge in the chamber and bore
- amount and even distribution of primer in the case

Also, a given rifle may have a preference for a certain brand of ammo, shooting it more accurately than other brands. Sometimes this is due to barrel harmonics – the vibration pattern of the barrel which occurs as the bullet travels down the bore. You will want to experiment with a variety of brands to see which works best for you. While this book isn’t a buyer’s guide, I have found CCI Standard Velocity to be the Honda Accord V6 of ammunition: better than nearly all the bulk grades, at half the price of exotic, match-grade brands.

In 2010 an expert benchrest shooter conducted a test of over 40 brands of .22LR ammo at 50 and 100 yards under rigorous, tightly controlled conditions. (His full report can be found here:

http://forums.accuratereloading.com/eve/forums/a/tpc/f/8711043/m/9871088921) At 100 yards, the most consistent, expensive match-grade ammunition made groups of .45" to .75". The best moderate priced ammunition (CCI SV and Minimags, Winchester) grouped at .94" to 1.1". Other first-tier bulk brands (CCI Blazer, Federal Value Pack) grouped at less than 2.0". (Remington, Aguila, Armscor and other bulk brands were not tested.) This was in one of the world's most accurate rifles, shot indoors with no wind. In practical outdoor conditions, the best-quality, customized 10/22s are capable of sub-1" groups at 100 yards with match-grade ammunition. You should expect groups of 2-3" at 100 from a stock 10/22, fired from a good benchrest, with first-tier ammunition and a decent scope. But some owners have found Remington Thunderbolts to work best in their rifles. There must be a scientific explanation of how specific ammo performs in a specific rifle, but it hasn't been found yet.

How accurate do you need your 10/22 to be? It depends on how you use your rifle. Here are some examples of the standard of accuracy needed for different purposes:

MOA = Minutes of Angle	MOA at 25 yards	MOA at 50 yards
Soda or beer can: 2.5" diameter	10.0	5.0
Squirrel's brain: about 1.25" long x 3/4" high:	5.0	2.5
Diameter of a paintball: .69"	2.8	1.4
Diameter of a golf ball: 1.68"	6.7	3.4
NRA Smallbore Silhouette Turkey: about 2.5"wide x 2"high (shot at 77 meters in competition)	na	2.1 (@84 yds)
100 ring of an ARA benchrest target: .50" (Note: uses outside edge scoring, shot at 50 yds.)	0.5	0.25
10 ring of a CMP Rimfire Sporter target: 1.75"	7.0	3.5
X-ring of a CMP Rimfire Sporter target: .875"	3.5	1.75
5-ring of a 400m Appleseed silhouette: 1.06"wide	3.9	1.9
10-ring of an ISSF 50-meter target: 10.4mm	0.8	0.4

Some of the specialized target competitions are clearly not suitable for 10/22s. But for most of our purposes, the 2 MOA standard of accuracy typical of the stock 10/22 is good enough. If you are shooting casually at moderate distances, bulk ammo is a lot of fun for the money. Many competitors in Rimfire Steel Challenge like CCI Minimags because their high velocity with the 40 gr. bullet cycles the action reliably and they have good priming which ignites reliably as well.

Caring for your Ammunition

A box of ammo isn't as fragile as a box of eggs. Still, you want to ensure your ammunition is not scratched, crushed, or bent as you store and transport it. It's a good idea to keep your ammo in a hard box of some sort.

All .22LR bullets today are lubricated, with a wax or oily coating. On very old cartridges this lube can harden and expand, causing problems in chambering. If you shoot regularly and rotate your inventory, this should not be a problem.

You also don't want your ammo to get wet. Especially in the cheaper grades of bulk ammo, the bullets can be a loose fit in the case. I've seen some cartridges in which you could spin the bullet in the case with two fingers. I have seen ammo used out in the rain become spoiled as water got in the case and turned the powder inside to mud. "Keep your powder dry" may have originated in the flintlock era, but it is still true today.

Chapter 4 Malfunctions

Most malfunctions are caused by a dirty rifle, by defective ammunition, or by improper installation of parts. Thoroughly cleaning the rifle is covered in Chapter 5. Following is a list of the popular malfunctions and their typical diagnoses:

Failure to Feed

Symptoms:

- Round does not feed from magazine at all
- Round may catch vertically in the magazine feed lips
- Round may catch on the breech face, partly in the chamber or entirely outside
- Bolt may not close more than halfway.
- Bullets may be shaved out of round as they enter the chamber.

Causes and cures:

- Magazine is not fully seated. Press it in until it clicks.
- Magazine is dirty. Disassemble and clean it.
- Magazine spring has insufficient tension. Disassemble magazine and ensure the spring has 1½ turns of pre-tension during reassembly.
- Magazine sticks up too high, contacts bolt. Mostly happens with non-Ruger magazines, or when resting the BX25 25-round mag on the ground or bench while shooting or gripping the magazine, which pushes the mag up into the well. Try different magazine and check your position.
- If barrel has a "match chamber" it may be too tight for certain types of ammunition that is overly long, has a thick case, or has a blunt nose. Try different brands until you find some that feed reliably.
- "Shaved" bullets may be due to a match chamber that doesn't like that ammunition, or to a condition known as "barrel droop". If the barrel shank is a loose fit in the receiver, tightening the V-block can pull down on the barrel forward of the receiver. This causes the breech to rise up; the chamber opening is too high and the bore slopes downward, while the round being loaded is angled upward. If your rifle has this condition, you can install an aftermarket V-block that has a vertical set screw inside that counteracts the downward pull on the dovetail. One brand of V-block, the Gunsmither, also has a flat upper edge that pushes straight back on the barrel rather than back-and-down. If your barrel does fit tightly, check for burrs or roughness at the edge of the chamber.

Failure to Fire

Symptoms

- Misfire (dud): round does not fire at all. There may be a light firing pin strike evident on the rim of the case.
- Hangfire: round fires after a delay due to slow primer or powder ignition
- Squib: round fires weakly, with an unusually quiet sound and little or no recoil. Caused by defective ammo with no or insufficient powder in the case. The bullet may be lodged in the barrel.

Safety Notes on Failure to Fire

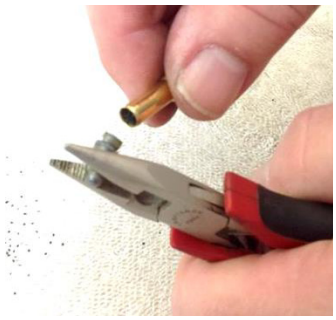
If a round does not fire, keep the muzzle in a safe direction for 30 seconds to ensure it is not a "hangfire" before ejecting the round.

If you suspect a squib, cease firing immediately and make the rifle safe. Inspect the bore to make sure there is no bullet stuck in it. Do not fire again until you have verified that the barrel is clear. Firing a follow-up shot behind a squib can destroy the barrel or receiver and severely injure the shooter or bystanders.

Causes and cures:

- Cartridge is not fully seated with the rim firmly against the breech. Firing pin energy is wasted driving the round forward rather than crushing the case rim. There are two possible causes:
    1. Bolt face and/or breech face, or chamber is dirty, causing round to chamber incompletely. After a long shooting session – or too many sessions between cleanings, a ring of hardened carbon can form in the chamber that impedes the round from chambering.
    2. Ammunition that is too wide or long for your rifle's chamber. Happens mostly with aftermarket or modified barrels with "match chambers." One way to test the ammo is to remove the magazine and place a round into the chamber. It should go all the way in easily, perhaps needing light finger pressure to seat the rim firmly. If you can't easily push it all the way in, the ammo is too long or wide for the chamber. You should be able to ease the bolt onto the round (to prevent slam-fire) and see that the bolt goes fully into battery. Then retract it and the extractor will pull the round out. If the extractor is not removing the stuck cartridge, this is your problem. In this case the fix is to use different ammunition.
- Firing pin obstructed by sludge or carbon in its channel. Disassemble and clean bolt assembly.
- If hammer strut spring was replaced with lighter spring, insufficient force on hammer. Replace with Ruger OEM hammer spring.
- Very dirty trigger group impeding hammer travel.
- Duds most often are due to a void in the primer within the case rim. Rotate the round so that a new part of the case rim faces up, and it should fire. If not, look for other causes. If it does not fire after three tries and there are no other explanations, the round is bad and should be discarded. The safest way to discard a dud round is to hold the bullet with pliers and bend the case away from it; the bullet will come out easily. Then dump the powder on the ground and place the bullet and case into a proper waste container.





Failure to Eject

Most frequently, failures to eject are caused by the bolt cycling too slowly or incompletely, or by the rifle moving during the shot. The fired case hits the breech or magazine and is stuck inside the receiver, or is caught by the closing bolt rather than being thrown free.

Symptoms:

- Stovepipe: fired case caught between bolt and receiver, sticks sideways from ejection port.
- Fired case caught inside receiver, above new round. You may have to remove the magazine and use a screwdriver or knife to pry the rounds out of the receiver.

Causes and cures:

- Rifle not held tightly; it moves rearward under recoil causing fired case to hit breech rather than being thrown free to the side. Ensure rifle butt is securely pressed into your shoulder pocket. You would be surprised how often this simple thing is the cause.
- Action gummed up with lube and/or dirt.
- Ejector is not seated properly in its slot in the trigger housing, causing the bolt to drag or even short-stroke.
- Scope base mount screws too long, rubbing on top of bolt.
- Action not properly lubed.
- Aftermarket bolt recoil spring too strong for the ammunition you are shooting.
- Magazine seated too high, catching on bolt. See Chapter 5, Task 11B for details.
- Hammer strut incorrectly installed so that hammer does not rotate fully rearward.
- The very tight chambers in some match barrels can cause drag on the fired case. Chamber must be kept perfectly clean and the extractor may need to be tuned or upgraded.
- If the unfired case is not ejecting when you cycle the bolt manually, the extractor may be dull; it can slip off the case rim leaving the round in the chamber. If this happens but the extractor is sharp, then dirt in the chamber is causing the case to stick.
- Also if manually extracting a live round with a match chamber, if the cartridge is too long the bullet may stick in the rifling of the bore, causing even the sharpest extractor to slip off the rim. This is one reason why rifles with match chambers are said to be “picky” about ammunition.

Slam Fire/Out of Battery Discharge/Case Rupture

The good news is that these are very rare. The bad news is that they could seriously injure you or bystanders and damage your rifle.

Symptoms:

- A slam-fire occurs when the bolt impacts a chambered round in such a way as to cause it to fire without pulling the trigger. If the round is fully chambered, typically there is no damage; but it illustrates the importance of keeping the muzzle in a safe direction at all times.
- Round fires although it is not fully chambered and bolt is not fully closed against the breech. You will hear an unusually loud report, and smoke appears from the ejection port.
- Usually, the case ruptures where it was exposed between the bolt and the chamber.
- An OBD can cause a squib, because much of the combustion gas pressure exits through the side rather than pushing the bullet through the barrel. Also, pieces of the case may be stuck in the barrel and in the action. Be careful to check for barrel obstruction. **If the case head separates from the case, check extra carefully that the case cylinder is not stuck in the chamber.**
- An OBD can also irreparably damage the magazine and the receiver, and blast the extractor out of the bolt.

Causes and cures:

There are two situations that can produce a slam-fire:

- The hammer and/or sear have been improperly modified so that the sear slips off the hammer when the bolt hits the breech, allowing the hammer to follow the bolt forward and hit the firing pin. If you have an aftermarket adjustable sear, the adjustment is too tight.
- If you are manually feeding rounds into the chamber, and the bolt is slightly loose in the receiver, the edge of the bolt face can be slightly off-alignment and hit the case rim. It is safer to use the magazine. When the bolt strips a case from the magazine, the case head slides up into the headspace recess from below, preventing such impacts.

Technically, an out-of-battery discharge in a firearm occurs when the firing pin hits the primer when the cartridge is not fully in the chamber, the bolt is not fully closed against the breech, and part of the case is unsupported. When the round fires, the high-pressure gas blows out the weak brass of the unsupported case wall. So defined, a 10/22 can almost never have an out-of-battery discharge. This is due to the design of the bolt and hammer. As shown below, the face of the hammer is flat. If the bolt is not all the way forward, the hammer will hit the bottom rear edge of the bolt first, stopping at an angle of more than 90° to the bolt; so that the hammer face cannot reach the firing pin. However, if an amateur gunsmith, while “radiusing” the bolt has taken off too much material from the bottom edge of the bolt, the hammer will not be blocked. (Radiusing the bolt is discussed in Chapter 6.) See photos below:

Bolt in battery allows hammer to rise to vertical. Note the overlap showing how little the firing pin protrudes from the bolt (bolt was placed slightly off centerline for this photo).

Bolt moved back a few 100ths of an inch. The hammer is caught on the lower edge and cannot reach the firing pin. This bolt was radiused by a professional.

There are four situations that produce the symptoms of an OBD, although they do not fit the above definition:

1. A squib, or a second round fired behind a squib, sends all of the gas pressure back into the chamber because it cannot exit the muzzle. In the first case, a defective case with weak brass could rupture. In the second, any ammunition would be destroyed.
2. A defective round that is “over-charged”; i.e., has too much powder in it, can produce excessive pressure that ruptures the case.
3. A sticky magazine (due to extreme filth or to insufficient tension of the magazine spring) fails to present the round fully so that it does not go into the chamber; or a defective round with a dented or bent case, or a very loose bullet, similarly fails to chamber. If the bolt’s rib or the sharp edge of the headspace pocket traps the round against the breech face in just the right way, the force of the bolt concentrated that point could crush the case rim to ignite the primer. This is known as a “slam fire” OBD.
4. An aftermarket bolt recoil spring that is too weak for the type of ammunition can allow the bolt to move backwards too far before the fired bullet can exit the barrel. The bolt breaks its seal prematurely, while gas pressure is still too high, and the excess gas comes back into the action. Make sure to use the correct spring for the ammunition you use.

Inaccurate or Inconsistent Shots

Sometimes a rifle won’t shoot consistently to point of aim and it isn’t the shooter’s fault. If you suddenly have expanded or off-target groups, check for these problems:

- Some types of ammunition are more consistent than others. Did you switch ammo?
- High velocity ammo tends to produce larger groups, and a higher point of impact, than standard velocity. Be sure to zero your sights with the same ammo you will shoot.
- Are your sights loose (if you have added aftermarket sights), or the sight adjustment screws?
- Are your scope mounts and rings tight? If you have a rail installed on the receiver, did the rail come loose?
- On some cheaply made scopes, the reticle can come loose inside the tube.

- Did your action screw come loose?
- Did the barrel retainer (V-block) screws come loose?
- If you recently removed and re-installed the barrel, is the front sight canted (i.e., not perfectly vertical above the bore centerline)? A cant to the left will produce shots that are left and low; mirror-image for a cant to the right.
- If you recently re-installed the barrel, are the barrel retainer screws torqued to the same tension (should be 10-12 inch-pounds) as before? If these screws are too tight, and the barrel shank is too loose a fit in the receiver, the barrel can droop slightly as the barrel retainer pulls downward on the dovetail slot in the barrel. This is especially critical if you use a scope or receiver-mounted rear sight, as the alignment of the receiver and barrel must stay the same.
- Beginning in 2013 there were problems with some 10/22s shooting far to the right or left. This was most apparent when using a scope or receiver sight. If you use the factory sights, it will not matter as both are lined up on the barrel. But if you use a scope or a receiver rear sight, you may not have enough windage adjustment to get on target. On some rifles, Ruger drilled the barrel hole in the receiver off-axis to the centerline of the receiver. This means that some barrels are crooked.

  You can test your rifle by removing the stock and clamping the barreled action on its side on a flat table. Measure the distance from the table surface to the nearest edge of the barrel at the muzzle. Then flip the action over, and measure the other side. The distances on both sides should be equal. The difference between the two measurements equals two times the actual error. The error, if any, could be as much as 1/16" or more.

  If your rifle has a crooked barrel hole, call Ruger Customer Service at your first opportunity.
- Does your receiver see-saw or rattle in the stock even after you tighten the action screw? Loose manufacturing tolerances can allow movement of the receiver in the stock. If the receiver is moving during the shot, the muzzle is also, and accuracy becomes random. The two best fixes for this are:
  - to install a rear tang (available from Kidd Innovative Design), which screws the rear of the receiver into the stock. This requires machining a recess into the stock to accept the tang, which should be done by an expert.
  - to "bed" the receiver using a layer of epoxy material to fill the gaps between the receiver and the stock. The method of doing this is beyond the scope of this book. Examples and a pictorial how-to can be found on the Rimfirecentral.com forum.

  A less comprehensive but cheap and simple fix is to place a few layers of electrician's or aluminum foil tape onto the stock to shim the gaps until the receiver fits tightly.

Mechanical Problems

Not all malfunctions involve failures to properly cycle the ammunition. Several kinds of mechanical problems occur with some frequency among new 10/22 owners, including:

Bolt release doesn't work

Most often, failure to close the bolt is due to not following the procedure shown in Chapter 2. To release the bolt you must pull the bolt all the way back and hold it while pressing and then releasing the bolt

release lever. A common mistake is releasing the bolt before releasing the lever – all this does it lock the bolt back again.

If you are working the release correctly, there is a simple mechanical cause. The lever should move lower under spring pressure. If the lever fails to move down by itself, the most likely cause is incorrect installation of the bolt lock spring. Either the spring is installed backwards, or the dogleg arm is sitting below the bolt lock plate. The dogleg arm of the spring must sit on top of the cross-arm of the bolt lock plate, and the upper arm of the spring must be trapped below the ejector pin.

It is also possible that the magazine catch is off-center, causing the bolt lock plate to drag on it. Reposition the mag catch and mag release lever if needed.

Trigger will not reset

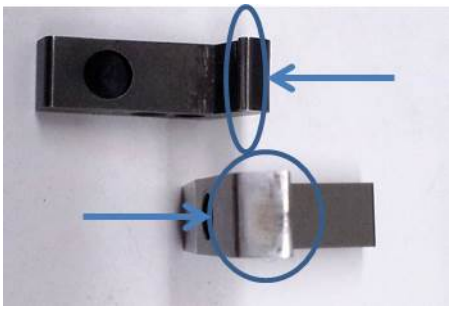
The standard trigger return spring is strong enough to reliably reset the sear/disconnector engagement. Problems with reset usually occur only on triggers that have been modified, either with a "trigger job" that changed the original parts, or by installing "drop in" parts. If your trigger goes dead after the first shot, the cause is likely to be one of these:

- First, you must determine whether (1) the hammer is failing to stay in the cocked position, or (2) the sear and disconnector are failing to re-engage.

  In the first case, the hammer is failing to be caught by the sear. If your sear and hammer do not look like the ones in this book, they may have been cut with a file or stone and require replacement. If they are ok, your hammer strut may not be all the way in place, blocking the hammer from moving all the way back to the cocked position. Or your hammer strut may be installed with the gap of the C-clip pointing down and the strut is binding in it. (There is some controversy about the last point – some say it doesn't happen. I've never seen it happen but install the strut the right way anyhow.)

- In the second case:
  - Make sure the sear spring is inserted correctly, with the fat end in the sear and the thin end in the disconnector, as shown below:

  - if you have replaced the trigger return spring with an aftermarket spring, or if someone cut a coil off the spring in order to lighten the trigger pull, the spring may be too weak to overcome the friction between the sear and the disconnector. Replace with a standard OEM spring and test.
  - You can reduce the friction between the rear face of the sear and the disconnector by polishing the sections shown below, and/or by applying some dry lube (such as Eezox or Froglube) on them. Be sure to follow the lube maker's directions – too much lube actually creates more resistance to the moving parts.



Arrows show the faces to be polished. It is critical to keep the surfaces flat at their original angles and the edges sharp, or the parts may slip when you pull the trigger. I start with 600 grit and go up to 1000, wet sanding on a flat plate. Go slowly – don't overdo it.

Notice how the rear face of my sear was not flat – the dished area in the center remains a bit rough, but the disconnector rides on the polished sides so it works ok.

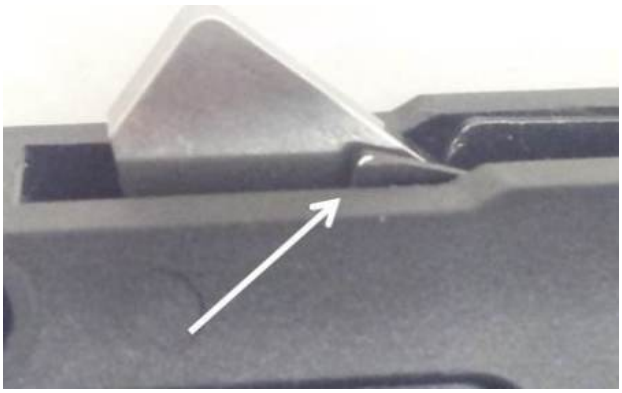
- If you have a Kidd trigger group, the hammer strut sticks out from the rear of the housing a little. If the strut contacts the stock, it may be blocked from making the hammer cock or the trigger reset. The fix is to cut (with a carving tool or drill) a small dimple in the stock where the hammer strut is hitting, to provide enough clearance for the strut.
- If you have an overtravel stop or adjustable sear, it may be set too tight.
- If you have mixed aftermarket trigger parts, such as a sear from one maker with a trigger from another, the parts may not be matching correctly. If you buy upgrade trigger parts, stick with one maker.

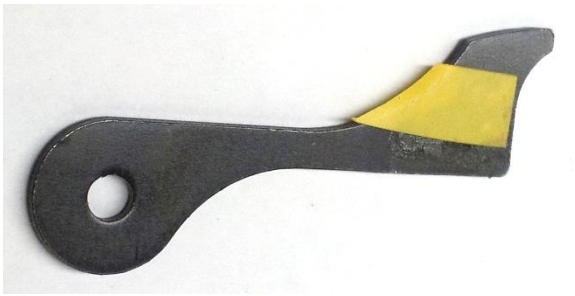
Safety doesn't disengage

If your safety will not disengage and prevents your rifle from firing, it may have rotated so that the cutout is no longer under the front leg of the sear. This can happen sometimes if you hold the safety in the centered position while removing the stock – when the detent plunger is just at the point between its two slots, the safety can rotate. To fix it, look down to determine which way the cutout is facing, grasp the safety between thumb and index finger, and rotate the safety to put the cutout back on top.

Multiple Problems with feeding, ejection, bolt cycling poorly

This is a rare one, but I saw it once on a friend's 10/22: check to see if an unfired round will eject without a magazine in place. If not, the ejector in the trigger group may have rotated out of its slot in the trigger housing and fallen backward against the right edge of the housing. This would happen during installation of the trigger group into the receiver. The left photo below shows where the ejector could lodge:





If your ejector is a loose fit in its slot, you must take extra care to ensure it stays in place when installing the trigger group into the receiver. Or, you can do what I do: put a small strip of electrical tape on the side of the ejector. This should add just enough thickness for the ejector to hold fast in the slot.

Chapter 5 Maintenance

Like any machine, the 10/22 requires regular maintenance in order to provide reliable, consistent service. Maintenance is comprised of three categories:

- **Cleaning**: The action and chamber are the most important parts to clean. Most failures are caused by dirty bolts, receivers, and magazines. Because of the blow-back operation, burned gases, unburned powder, and bullet lube are forcefully sprayed into the action and magazine.
- **Lubrication**: There are only a couple of places that get a little dry lube. Many failures are due to too much oil, or oil in the wrong places, which turns into a sticky sludge after a short time of shooting. A dry lube that does not attract and hold dirt is recommended for the action. Some owners put a small dab of grease on the sear/hammer interface and the slot for the hammer strut in the rear of the hammer, but these are the only places where grease should be used. It is better to run the rifle dry than to over-lube it.
- **Rust Protection**: Especially if you live in a humid or salty environment, certain parts need protection from rust. The bore, barrel, and charging handle are especially vulnerable.

Because the 10/22 is so simple to work on, you can complete a basic yet thorough cleaning in less than twenty minutes. A complete disassembly, cleaning and reassembly takes less than an hour. So there is no excuse for failures to feed, fire or eject due to a dirty rifle.

How often should you clean?

This can be a controversial subject, and people often hold strong opinions on it. A good answer depends on how you use your rifle. If you are a benchrest shooter going for sub-.25" groups at 50 yards (half-minute of angle accuracy), or a long-distance competitor (100 yards or more) it might be every 50-100 shots. Other competitive shooters might clean after each day. Some owners clean when their groups open up, or when the rifle begins to malfunction. (I do not recommend this.) Others follow the rule that "one does not go to bed with a dirty rifle." All of the champion shooters I have read about say they keep their rifles meticulously clean.

Visual inspection will also help you decide. Some brands of ammunition are dirtier than others, in both the powder soot and the lube on the bullets. If you see gunk in your action, you need to clean.

The answer also depends on what kind of cleaning you do. If you clean the bore, breech, bolt and action frequently with patches and solvent, you will not get the heavy fouling that requires a bronze brush. The trigger group does not get very dirty and can easily go for several thousand shots between cleanings.

I shoot my 10/22s about once a week, between 20-100 rounds each time, and up to 500 rounds in a long Appleseed day. My preference is:

- After every shooting day: clean the bore (with patches and solvent), chamber, breech, bolt face, and outside of the barrel – not only for cleanliness, but to renew the rust protection while the rifle sits in the safe for up to a week or two at a time. Keeping these parts clean ensures reliable feeding, ignition, and ejection and consistent point of impact.
- Once a month (or after a heavy shooting day), the bolt is removed and the inside of the receiver cleaned and lubed.
- The trigger group doesn't get very dirty because it is entirely covered by the bolt during case ejection. Two or three times per year I disassemble the trigger group for a full cleaning and lube.

- I regularly lend two of my 10/22s to Appleseed students. A regular, 2-day Appleseed consists of up to 500 rounds in the outdoors all day long in all sorts of weather. After each event, the rifle gets the complete service. If the students are shooting especially dirty ammunition or if it is wet, I'll give it the complete service after each day. After all, it takes less than 30 minutes.

Magazines get dirty rather quickly. This makes sense when you consider that the magazine is directly below where gas, soot, and unburned powder blow out of the breech after each shot. I number my magazines, and as soon as a particular mag gives one failure to feed, it gets set aside for a full cleaning. Otherwise, a few times per year there is a rainy day on which I'll do them all.

Before you start

Tools Required: You don't need specialized tools to work on your rifle. You will need:

- Flat-blade screwdriver, 1/4 or 5/16 inch width. Ideally, a hollow-ground or parallel face gunsmith driver, but a normal one will do. Gunsmith screwdrivers really are better because the blade acts on the bottom of the slot in the screw. The tapered blade of a regular driver contacts the upper edge of the slot, and can more easily cam out and damage the screw.
- A punch or drift to push the pins out, could be steel, brass or wood. A 3/32" punch is ideal for all of the pins in the trigger group. Kebab sticks are often 1/8" diameter, just right for non-marring pushing of pins. Their points are good for cleaning tight places.
- Small hammer for the punch if the pins are sticky.
- 5/32 inch steel roll pin punch if you are removing the firing pin.
- 5/32 inch hex key (Allen wrench) for your action screw, or if you plan to remove the barrel. For the Allen wrenches, an L-shaped single wrench is better than a jackknife-style folding wrench set, which could scrape on the barrel.
- 9/64 inch hex key for disassembling the 10-round magazine.
- 3/32 inch hex key for disassembling the 25-round magazine.
- Not required, but a good idea, is a torque screwdriver that enables consistent tightening of the action screw and barrel retention screws.

Work area: Not required, but you would like to have:

- A well-lit bench or table, large enough for your rifle, with designated spaces to put tools and parts
- A pad or towel to rest the rifle on (a light, solid color is best so it is easy to find small parts)
- Dish to hold small parts as they are removed. A magnetic dish is best. If you put all the parts you remove into one dish, you will know whether you have missed anything when you're done.
- Large Ziploc bag to work in when removing small parts with springs
- It helps to keep your work area, including the floor, meticulously clean and uncluttered. If you drop or let fly any parts, it will be easier to find them.

Cleaning Supplies:

- For barrel cleaning: A pull-through system such as Boresnake, Patchworm, Pro-Shot or Otis, or a cleaning rod with patch jags, brass brush and patches, sized for .22 caliber. If you use a rod, do not use a cheap aluminum rod made from short sections screwed together. These are too flexible and the joints have sharp edges that will dig into the bore, especially the edges of the rifling lands. Also, uncoated aluminum oxidizes quickly to form a coating of aluminum oxide which is highly abrasive (they make sandpaper from it). Use a one-piece, brass or stainless steel, carbon fiber or nylon-coated rod that is as stiff as possible so that it will not bend in the bore and touch the rifling. I use a Dewey brass rod for my rifles. Pictured below are the tools I use for cleaning my 10/22s:

All of my 10/22s have a hole drilled in the receiver for a cleaning rod to pass through. This lets me use a rod to clean from the breech, as with a bolt-action rifle.

You can get a precision jig to drill this hole from gunsmithertools.com or Brownells, or borrow one in circulation on the rimfirecentral.com forum.

If you don't have such a hole, you can still use a rod with a muzzle guard, or a pull-through system.

Nylon bristle, brass core chamber brush made from a Pro-Shot rifle-length bore brush. This works well on the chamber if the carbon ring isn't too bad. Dewey also makes a good brass-core brush.

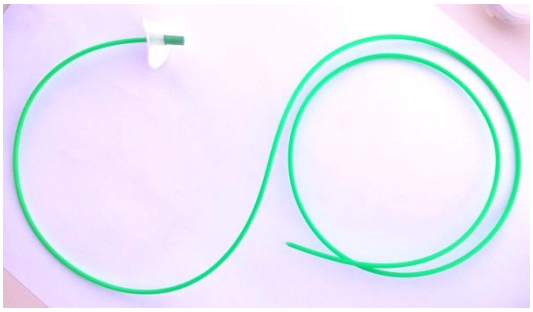
This handy brush can be used through the ejection port, so disassembling the rifle is unnecessary.

Home-made chamber brush from a worn-out Hoppe's bore brush. Not the best solution. The core is steel requiring great care not to scratch the bore and the worn bristles won't clean very well.

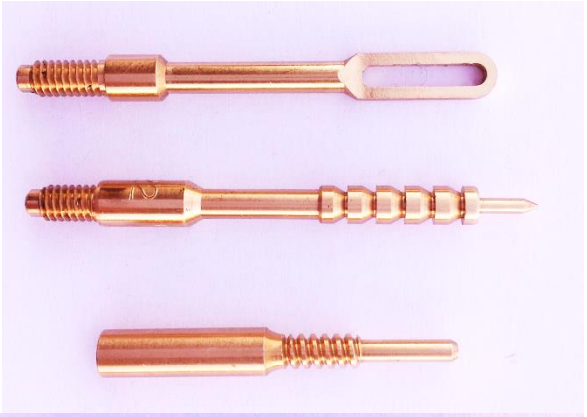
My bronze chamber brush made from a rifle-length, brass core bore brush. If the carbon ring is very bad, I'll use this instead of the nylon brush above.

Patchworm pocket field kit lives in my range bag and has fittings for multiple calibers up to 12 ga shotgun. It also holds my chamber brush and a small, homemade punch. One patch container holds dry patches, the other holds patches soaked with Ballistol. Most pull-through systems use brushes and loop jags. They cannot provide a tight fit for the patch in the bore. But the Patchworm button makes a very tight fit.

When I bought my first 10/22, I used a Boresnake. The thin parts at the top are the bronze brush sections. The idea is that the thick, braided material will compress in the bore to fit tightly and scrub off the fouling. One pass and you're done. But it also drags that dirt across the rifling lands and against the muzzle crown, and does little for the chamber. Once dirty, you have to clean it before re-use. I no longer use it for regular cleaning.



Patchworm with .22 button and patch attached



Top is loop jag for patches. It is a loose fit so it can't scrub the bore. Basically only good for wetting the bore with solvent.

Spear-tip patch jag. A patch on this jag fits tightly in the bore to clean out the fouling. It is unidirectional. Once pushed through, I remove the dirty patch before retrieving the rod.

Jag for VFG pellets This one from Dewey needs an adapter to fit on a normal rod.

The VFG pellet screws onto the jag so you can use it so scrub back and forth in the chamber. It also gets into the grooves of the rifling better than a patch on a jag. But the VFG system is expensive – about 5 cents per pellet.

- Muzzle guard to protect the muzzle crown if you are using a cleaning rod from the muzzle end.

Plastic muzzle guard between cleaning rod and muzzle

- For chamber cleaning: bronze or nylon bristle chamber brush. Cheap brushes use a steel loop core that can easily scratch your bore if allowed to scrape it. Good quality brushes have a brass core.
- Small plastic brush (a used toothbrush works fine), and small brass bristle brush for the breech and bolt
- Q-Tips for tight corners in the receiver and bolt
- A few clean rags
- Gun cleaning solvent. Harsh, copper-dissolving solvents are not needed for .22s. **Take care with your choice of solvent. Some products can damage plastic parts, the painted finish on your receiver, and wood stock finishes.** I once ruined the plastic trigger guard of a Marlin with Break-Free Powder Blast.

  The solvents I use most often now are Ballistol, Froglube Solvent, Eezox and Bore Tech Rimfire Blend. Every experienced shooter has his favorites, and arguments about which is best are like similar arguments over which oil is best for your car – amusing but endless.

  If your barrel has heavy lead deposits in the grooves, Kroil does a good job of getting underneath and lifting the lead so your brush can scrub it away. Get the bore quite wet and let it soak overnight.

  TIP: When applying solvent, let it sit for about 60 seconds before wiping or brushing, to allow the chemical to dissolve the fouling. This saves a lot of effort and does a better job.
- Gun oil and rust preventer. My favorites are Ballistol, Froglube and Eezox.
- Dry lube such as Froglube, Liquid Wrench Dry Lube or DuPont Teflon Multi-Use (among many brands)

Now you're ready to begin working on your rifle.

Chapter 6 Disassembly, Cleaning and Reassembly

If you are going to replace Ruger OEM action parts with new aftermarket ones, have your new parts ready on the work area to substitute for the OEM parts during reassembly.

As a general rule, when disassembling, pins are driven out from the left side to the right, and when assembling they are inserted from right to left. The sides are determined from the shooter's point of view, looking from the buttstock toward the muzzle. But sometimes they go in or out easier the other way.

This section will not cover removal/installation of the safety. In normal use, you will never need to remove the safety for maintenance. Some owners may want to install an aftermarket safety with a larger button, or a left-handed safety. Instructions for removing and installing the safety are at the end of the Customization section.

Task 1: Ensure Safety

The first thing you do when picking up your 10/22, and every time you pick up or are handed a firearm, is clear it and ensure it is in safe condition. Follow the steps in Chapter 2 of this Guide to make the rifle safe before doing anything else.

Task 2: Remove the Stock

1. If your rifle has a barrel band, remove or loosen its screw, and then slide it forward off the stock and over the muzzle. If you do not sufficiently loosen the band it may scratch the stock as you slide it forward. If you have a very tall front sight, the barrel band may not slide off over it – wrap the barrel with a rag where the band contacts it to prevent scratching the barrel.
2. On the underside of the rifle, just in front of the magazine well, is a 5/16" flat-slotted screw. 2013 and newer 10/22s have a hex socket screw. Loosen this screw until it is free of the receiver. The screw is captured in the stock, so you don't have to remove it completely.
3. Release the bolt, set the safety to Fire, and then pull the trigger to de-cock the hammer.
4. Push the safety in to the right – it will only go halfway. Holding the safety in this centered position, lift the barreled receiver away from the stock. If the safety is all the way left or right it will hang up on the side of the stock and prevent removal, and possibly scratch the stock.
5. Lay the stock safely to the side of or away from your work area. Do not stand it up – chances are it will fall and get scratched.

Task 3: Remove the Trigger Group

Pins for trigger group and bolt removal
1. Bolt stop pin
2. Receiver cross pins

1. Cycle the bolt to cock the hammer and set the safety to SAFE. If the hammer is forward (in the fired position), its pressure on the bolt will make it hard to remove the pins in Step 2.
2. Working from the left side of the receiver, push out the two receiver cross pins and set them aside. The pins are easier to push out if you do the front one first.
3. Pull the trigger group down out of the receiver. Set it aside.

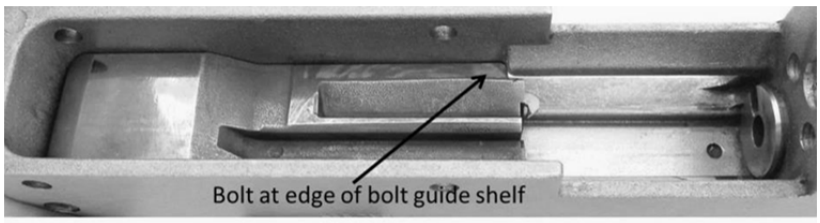
Task 4: Remove the Bolt

Bolt assembly and trigger group separated from receiver. Red pin at top left is a polyurethane buffer which replaces OEM steel bolt stop pin to reduce shock and noise when bolt cycles.

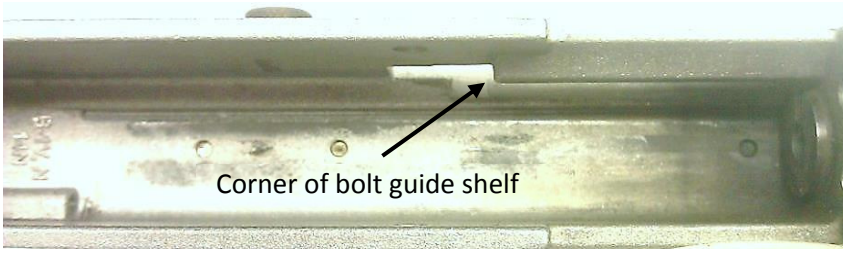
1. With a punch, push the bolt stop pin, from left to right, out of the receiver.
2. Turn the receiver upside-down. Pull the bolt handle all the way to the rear.
3. Lift the bolt out of the receiver. This can be fiddly, but if Ruger got the bolt in there, you can get it out. On some newer rifles, the bolt will not simply pull up and out. It may hang up on a burr at the corner of the bolt guide shelf (a ledge cast into the receiver, see photos below). If so,
    - Turn the receiver over and tap it gently against the top of your bench with the bolt handle all the way back. This will allow the back of the bolt to fall free and the front will follow.

- Or, you can lift the bolt high enough for the bolt handle to slide forward without it and ease the handle forward, away from the bolt. You may have to press the guide rod down towards the top of the receiver with another finger to get it clear of the bolt. This takes the pressure off the bolt, making it drop out more easily. Then turn the receiver and allow the bolt to fall onto your bench. This method always works. Later, you can file the burr from the bolt guide shelf to solve this problem (don't take off more than a few thousandths of an inch and round the edge a bit).

4. Pull the bolt handle/guide rod assembly out through the ejection port.



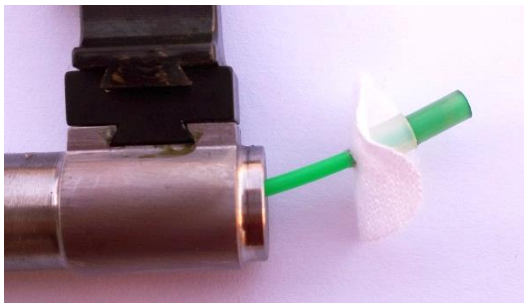
On my new (2013) 10/22, the bolt caught on a burr at end of guide shelf.



If needed, gently file the corner and end of the shelf to make clearance for the bolt. Go slowly and test fit before taking off too much.

Task 5: Clean the Receiver and Barrel

1. Use your tooth brush and solvent to clean the breech face (end of the barrel facing the bolt). Be sure to clean the extractor channel on the right side of the breech.
2. Use your toothbrush or rag, Q-Tips and solvent to clean the inside of the receiver.
3. Dry the breech and receiver with a clean rag. Cleaning the receiver and breech first prevents introducing dirt into the barrel when you do the next step.
4. In rimfire rifles, the chamber is the most important part to keep clean. If the chamber is not kept clean, a hard carbon ring can form just ahead of the case mouth which can prevent rounds from seating or ejecting properly. Put a good coat of solvent in the chamber and let it sit a few minutes. Insert your chamber brush with a twisting motion and rotate the brush back and forth in the chamber as you gradually pull it out. Do this again. Then use a Q-tip to swab and pull the loosened fouling out of the chamber mouth. Even better, to finish the chamber, I like to pull a patch on a Patchworm from the muzzle. The clean cotton and plastic will not damage the muzzle crown, and this way I pull the dirt out of the chamber mouth rather than push it all the way through the barrel. When using the Patchworm, push the patch and button into the hole to start it.



A dry patch started from the muzzle for cleaning the chamber after brushing with solvent.

5. If necessary, clean the bore with your cleaning tools and your favorite solvent. First, apply the solvent with a well-soaked patch and let it sit for a few minutes so it can chemically dissolve the fouling. The dirtiest parts will be at the ends – just in front of the chamber and the front two inches of the bore. Then, if the barrel and chamber are heavily fouled, use the brass brush with solvent. Be sure to push the brush all the way through – do not reverse brush direction while it is still in the barrel. Also, you must hold the rod by its handle so that the rod can rotate with the rifling. You don't want to push across the rifling or your brush/patch will not clean the grooves. Third, push or pull a dry patch or a pellet through the bore, and another, continuing until the patches are clean. If the patches are not clean after 3 tries, repeat the whole process.

   The muzzle crown is the front surface of the barrel and the critical part is the edge of the bore. Scratching the crown can ruin the accuracy of the rifle. Be sure not to touch the muzzle crown with your metal cleaning rod or tool. Use your solvent and a plastic brush and then a clean rag to clean the star-shaped fouling off the muzzle crown.

   For advanced barrel cleaning techniques, refer to the links in the Websites section of Chapter 7.

   TIP: If you are using a Boresnake, be sure to pull straight out without dragging the cord or cleaning material over the muzzle crown. You don't want to grind that dirt-encrusted cloth into the crown –it would act like sandpaper. Also, wash your Boresnake regularly – you can do this by hand or in a mesh lingerie bag in your washing machine. I prefer cleaning with patches to avoid re-introducing the dirt I just removed from the bore. I keep a clean Boresnake in my range bag for emergencies in the field.

   TIP: If you use a cleaning rod from the muzzle, you must use a muzzle guard to protect the muzzle crown from being scratched. To avoid bending, go slowly and do not push too hard.

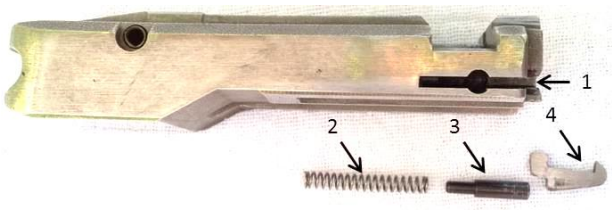
   TIP: It is possible to drill a hole in the back of the receiver perfectly in line with the bore so you can clean with a rod from the breech, which is the method preferred by experts. A jig is available (either from Brownells or Gunsmither Tools) that makes this simple if you are handy. Or have it done by a reputable gunsmith.

6. Oil the bore lightly to prevent corrosion. Lightly. Just draw an oil-dampened patch through the bore, or follow the directions on your chosen lube product.

7. If you desire, put a thin coat of dry lube on the inside of the receiver where the bolt contacts it. Do not forget the bolt guide shelf above the ejection port. **Be careful not to get dry lube on any painted parts – some dry lubes contain chemicals that eat paint.** Allow this lube to dry before re-assembly.

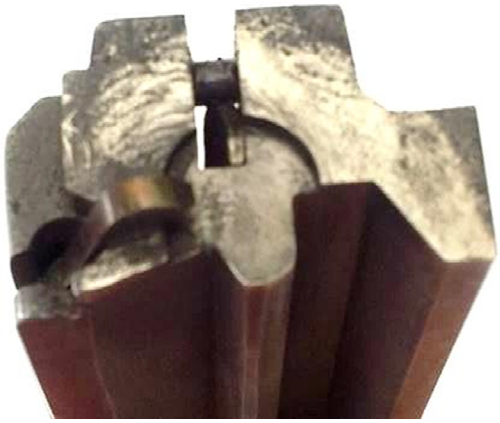
Task 6: Clean the Bolt, Extractor, and Firing Pin

1. Extractor spring and plunger
2. Extractor



1. Extractor slot
2. Extractor spring
3. Extractor plunger
4. Extractor

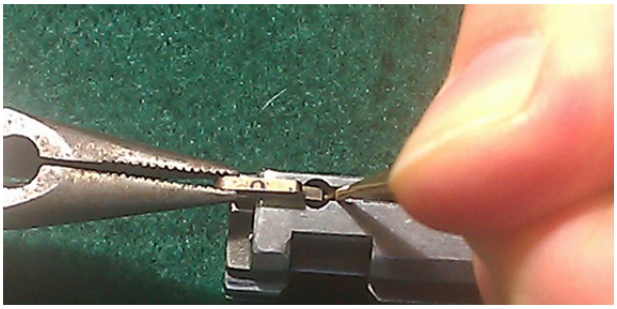
1. With a rag, Q-tips and solvent clean all surfaces of the bolt.
2. With a brush or Q-tip and solvent, clean the bolt face, paying special attention to the round cutout in which the cartridge head seats. If carbon is caked on, you may need to use the point of a kebab stick or toothpick, or a brass brush. Dry thoroughly.



A (not very) dirty bolt after 100 rounds of shooting, with soot on the face and in the headspace recess. If this is allowed to build up, rounds will not chamber solidly, the bolt will not close fully on the breech, and you will have failures to fire and inaccurate shots.

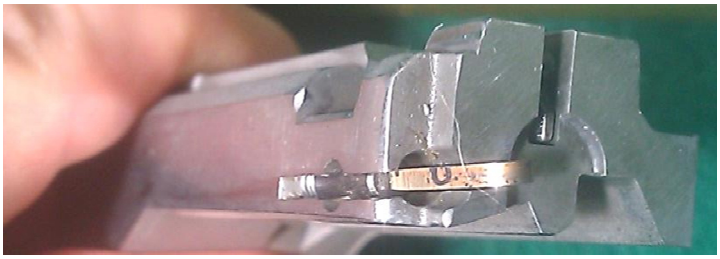
Cleaning the bolt face with solvent and a brush. Once all the carbon is loosened, use a rag and Q-tips to make sure it is mirror-clean, especially in the headspace recess.

3. To remove the extractor, push the extractor plunger all the way rearward into the bolt body with a very fine (1/16”) punch, a pick, or a screwdriver. While holding the plunger in, pull the extractor sideways, then out of the front of the bolt. The spring is pretty strong - do not let the plunger fly out. You may want to do this in a bag to avoid losing parts.



Pulling the plunger back with a 1/16” punch, and pulling the extractor out with pliers. Note that the plunger is pulled past the round hole, and the rear of the extractor is even with the hole. The hole is drilled past the extractor channel to make a well in which the square-shaped rear of the extractor fits. When re-inserting the extractor, make sure it drops all the way in.

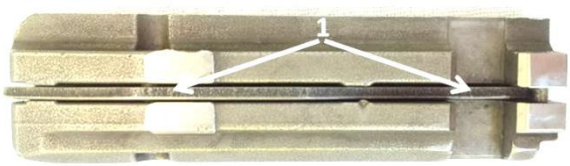
4. Clean the extractor and its channel in the bolt with a brush and solvent. You may want to use compressed air to blow out any dirt from and dry the extractor channel.
5. Inspect the extractor. The inner point should be sharp. Ruger OEM extractors are stamped of fairly soft steel. If your extractor is dull, you can sharpen it with a fine file; or you can replace it with an aftermarket extractor made of harder steel.
6. Re-install the extractor: fit the spring onto the plunger and insert them into the extractor channel. Pull the plunger back with your punch (as in Step 3) and place the rear of the extractor in the round hole, then slowly release the plunger. Press the extractor tip toward the outside of the bolt to test that it is seated and working correctly. If the extractor is not fully inserted towards the bolt’s centerline, it will pop out. If it is in place, it will spring back towards the center.



When the extractor is properly installed, the plunger will sit partly to the outside of it, as shown.

7. If your firing pin is very dirty, you may need to remove and clean it, as well as its channel in the bolt. This is rarely needed, unless you are using extremely dirty ammunition or have used oil on the firing pin and created sludge.

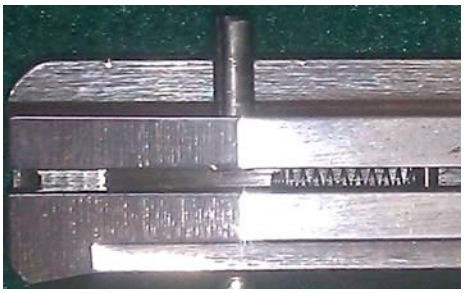
   To remove the firing pin, place the bolt on some blocks or in a vise. Be sure to pad the vise jaws with wood or plastic to protect the bolt. Drive the roll pin part-way out with a 5/32” roll pin punch and a hammer – multiple light taps are better than heavy blows. For this job, a steel punch is better than a brass one – the soft brass will mushroom. Do not drive the pin out all the way, just far enough to release the firing pin. If you do drive the pin out completely it can be difficult to align when re-installing it. Lift the firing pin slightly at the rear and slide it rearwards it out of its channel.



1. Firing pin.

Stop pin must be pushed out with 5/32" roll pin punch

8. Inside the channel is the firing pin return spring. Remove this carefully and put it in your parts dish before cleaning the channel.



Firing pin return spring lies under the firing pin. Its front butts against a small fixed pin in the middle of the bolt. There is no need to remove this pin. The narrow end of the return spring goes at the front, and the wide end contacts the firing pin.

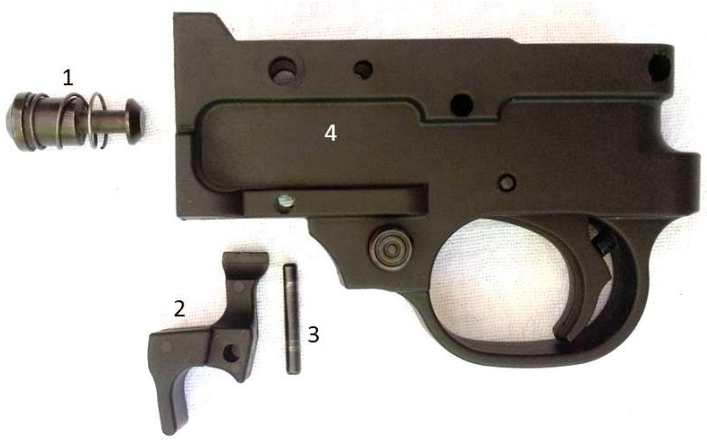
9. Once everything is clean and dry, insert the return spring, then the firing pin from the rear. Push the firing pin forward to line up the hole with the roll pin, and tap the roll pin back in place with your punch and hammer. If you removed the roll pin, make sure it is lined up straight with the open seam facing up before hammering on it. It is important that the open seam be at 90° from the impact point for the pin to absorb shock properly. Make sure the roll pin is completely inside the bolt on both sides.

Task 7: Disassemble, Clean and Lube the Trigger Group

Trigger group before disassembly.
Numbered parts are:
1: Ejector pin
2: Hammer pivot pin
3: Trigger pivot pin
4: Trigger return plunger
5. Bolt lock lever (blade)
6. Mag release/bolt lock pin
7. Magazine release (extended type)
8. Ejector

1. Turn the trigger group so the left side faces up. Note that the hammer pivot pin is larger (.154”) than the other three pins (.122”).
2. If the hammer is uncocked (up and facing forward), push it back to the cocked position and set the safety to SAFE. This will give you room to work in the front of the housing while preventing the hammer from springing forward if you should accidentally brush the trigger.
3. Locate the magazine latch/bolt lock pivot pin at the lower left of the housing (pin 6 in photo), just above the bolt lock lever. With a punch, push the pin out.

4. Push the magazine catch all the way in, and pull the magazine release straight down to remove it. Ease the magazine catch forward and remove it.



1. Magazine catch and spring
2. Magazine release lever
3. Mag release/bolt lock pin
4. Trigger group housing

5. Locate the ejector pin near the top of the housing. Use your punch to push the pin out. This will also release the tension from the bolt lock spring. Remove the bolt lock and ejector.

Ejector (top), ejector pin, and bolt lock (bottom). Note in this photo (unlike the photo on page 7) the rounded hole at the top of the bolt lock, which makes it an auto bolt release. This allows you to release the bolt simply by pulling the handle back and releasing it like a slingshot. It is a modification you can do, or you can buy an aftermarket bolt lock with this feature.

6. Set the safety to FIRE. Put your thumb or fingers closely over the hammer to cushion its movement, and pull the trigger to decock the hammer. Allow the hammer gently to fall forward until the hammer strut falls free of its slot in the back of the hammer. Remove the hammer strut; if may fall out if you turn the housing over, or you may have to push it from the hole at the rear of the housing with your punch.
7. Locate the hammer pivot pin at the center of the housing. Push this pin out. Turn the housing over and allow the hammer and bolt lock spring to fall out. On some 10/22s, the hammer bushings are cast into the hammer; on others, the bushings are separate from the hammer.
8. Locate the trigger pivot pin. Push it out slightly to the right. **TIP:** Put your left hand over the trigger housing to catch any small parts or springs, and with your right hand pull the pin the rest of the way out. The sear and sear spring are likely to pop out into your left hand. Pull the trigger/disconnector assembly out of the top of the housing, being careful not to allow the disconnector pin to fall out.
9. Remove the trigger return plunger and its spring from the rear of the trigger guard.
10. With Q-Tips and solvent, clean the inside of the trigger housing, including the hole for the magazine catch. Then dry it with a dry Q-Tip, a clean rag or compressed air.
11. With a rag and solvent, clean the trigger group parts thoroughly, and then dry them.

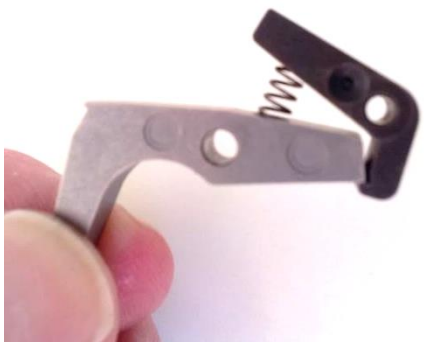
12. If you desire, put a very small dab of bearing grease or dry lube on the hammer sear notch and the lower part of the slot where the hammer strut rides in the hammer.

Task 8: Re-Assemble the Trigger Group

Part 8A: Trigger/Sear Assembly:

Trigger assembly parts in relative positions:
1. Hammer
2. Disconnector
3. Sear spring
4. Sear
5. Disconnector pin
6. Trigger return plunger and spring
7. Trigger
8. Trigger pivot pin

1. Gather the trigger return plunger and spring, trigger, disconnector, disconnector pivot pin, sear, and sear spring.
2. Insert the trigger return plunger and spring into the hole at the back of the trigger guard. If it falls out, a small dab of bearing grease on the end will make it stick inside its hole.
3. Insert the disconnector into the top of the trigger, line up the holes, and insert the pin. If the pin is a loose fit and falls out easily, you can hold it in place with some masking tape on one side.
4. Insert the sear spring into its hole in the sear. Place the sear in position under the disconnector, and insert the other end of the spring into the hole in the disconnector. Press the rear of the disconnector down onto the sear so that the sear clicks into its slot; this should hold the sear and disconnector together. If it does not, you can use a short “cheater pin” in the trigger pivot hole to hold the sear in place while you work. If you don’t have such a pin, you can make one from a kebab stick, 1/8” diameter string trimmer line or a round toothpick. Cut it so it fits entirely inside the trigger without sticking out on either side. (See photo on page 5.)



Alternatively, you can fit the sear, spring and disconnector with the sear in its slot, then carefully insert them into the trigger

TIP: If you magnetize the parts slightly, they will stay together better.

5. Hold the trigger group housing vertically. The safety should be on FIRE. Remove any masking tape and lower the trigger assembly into the housing. Once it is inside the housing the sides of the housing will prevent the disconnector pin from falling out. Line up the holes for the trigger pivot pin and insert the pin. If you used a cheater pin, it will be pushed out now.
6. Push down on the top front of the sear with your finger or a punch. You may hear a click – that is the rear of the sear engaging in its slot in the disconnector. The sear must be properly engaged in the disconnector for the trigger to function and for insertion of the hammer assembly.

Trigger group is inserted, ready to insert trigger pivot pin. To line up the holes properly, safety is off and trigger is pressed slightly. You can see the kebab stick cheater pin I used to hold the sear in place.

Trigger pivot pin being inserted from the right pushes the cheater pin out.

Part 8B: Hammer Assembly

Parts of hammer assembly in relative positions
1. **Hammer (flat part at left is the front)**
2. **Hammer bushings go in lower hole in hammer with wide flange flush against hammer**
3. **Bolt lock spring goes over right side hammer bushing**
4. **Hammer pivot pin goes through bushings**
5. **Hammer strut assembly (strut, spring, C-clip)**

1. Gather the hammer, bushings, bolt lock spring, hammer strut, and hammer pivot pin.
2. Insert the bushings into the hammer, if needed. Place the bolt lock spring on the right side of the hammer so that the hammer is in the middle of the V with the dogleg arm of the spring facing forward.

Right side of hammer assembly showing bolt lock spring installed on bushing. The dogleg of the spring is on the front side of the hammer.

3. Insert the hammer assembly into the housing, line up the holes, and insert the hammer pivot pin. You may have to set the safety to FIRE and pull the trigger slightly to line up the holes. That is ok, as the hammer spring is not yet installed.
4. Some trigger upgrade kits come with a lighter hammer spring to reduce the trigger pull weight. If you want to change your hammer spring:
   - Drill a hole into but not through a block of wood. I used a 5/32” bit for the one below.
   - Place the round end of the hammer strut into the hole, deep enough to hold the strut in place.

   - Hold the spring tightly between thumb and forefinger. Pull the spring down.
   - When the C-clip is loose pull it out with your other hand. Lift off the spring. Notice that the C-clip is dished slightly. The concave side goes up, away from the spring.

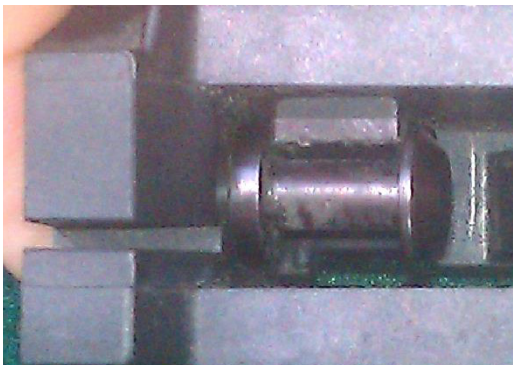
- Place the new spring onto the strut, pull it down, and replace the C-clip. Make sure the C-clip is completely seated.

5. Set the safety to FIRE. Pull the hammer forward to make room for inserting the hammer strut. Place the hammer strut, with the open part of the C-clip facing upward, into its hole at the rear of the housing and press it in place. You may want to hold it in place with needlenose pliers. If the opening in the C-clip faces down, pressure from the hammer can cause the strut to move in the clip and bind.
6. Pull the hammer up and back and insert the end of the strut into its slot in the rear of the hammer. Press the hammer all the way back until it cocks. The hammer should rotate smoothly. If it does not, the hammer strut is not correctly installed.
7. With your left-hand fingers over the hammer to cushion its movement, press the trigger to test the function of the trigger and hammer assemblies. Then cock the hammer and set the safety to SAFE.

Part 8C: Bolt Lock and Ejector

1. Gather the bolt lock, ejector, and bolt lock/ejector pin.
2. Rotate the bolt lock spring all the way back and insert the bolt lock into the housing; the main part of the bolt lock goes flush against the left side of the housing. Rotate the spring forward; the dogleg should go down into its slot in the right side of the bolt lock.
3. With a finger, press the straight arm of the spring forward and down below the pin hole on the right side of the housing. Insert the pin part way to capture the spring.
4. Place the ejector over the pin, with the point of the ejector at the top, facing forward. Make sure the ejector is not trapped between the bolt lock and the left side of the trigger housing. Push the pin all the way in, through the upper hole of the bolt lock and the trigger housing. Place the ejector in its slot at the front of the housing.
5. If you try to test the bolt lock at this point, it will not work. The mag release/bolt lock pivot pin must be installed for the bolt lock to function.

Part 8D: Magazine Catch and Release

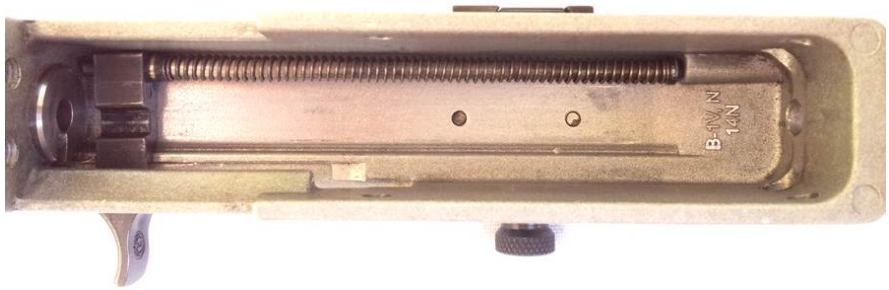


Magazine catch pushed in with finger to allow mag release to slide up

1. Gather the magazine catch, mag catch spring, magazine release, and mag release/bolt lock pivot pin.
2. Place the mag catch spring over the shank of the mag catch. Insert the mag catch into its hole at the front of the housing.
3. Press the mag catch all the way in. Insert the mag release into the bottom of the housing so that the vertical part goes to the right of the mag catch and above the shank. Release the mag catch. The mag release should now be captured in place by the mushroom-shaped end of the mag catch.
4. Line up the holes and insert the pivot pin from the right side. You may have to insert the pin part way, keep light pressure on it, and then wiggle the mag release to line up its hole, and then wiggle the bolt lock to align it and fully insert the pin.
5. Test the mag release and the bolt lock to ensure they function correctly. If the bolt lock does not move smoothly all the way up and down, you probably have installed the left-side hammer bushing backwards. The wide flange goes against the hammer.

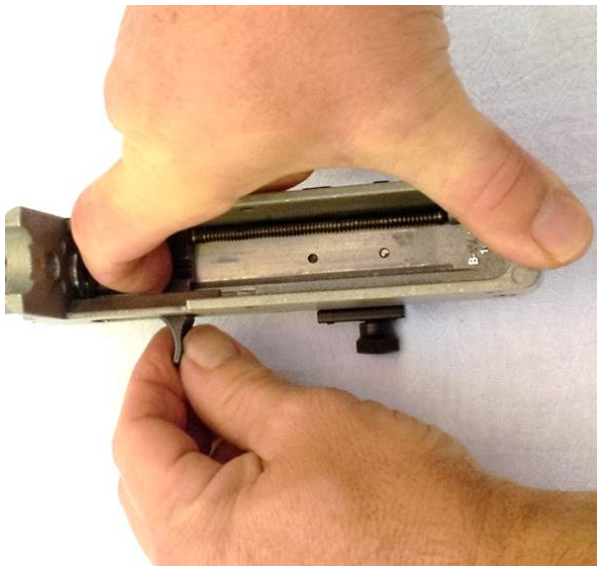
Task 9: Re-Assemble the Action

1. Turn the receiver upside down. Insert the bolt guide rod in through the ejection port and place its point into the anchor well in the receiver.

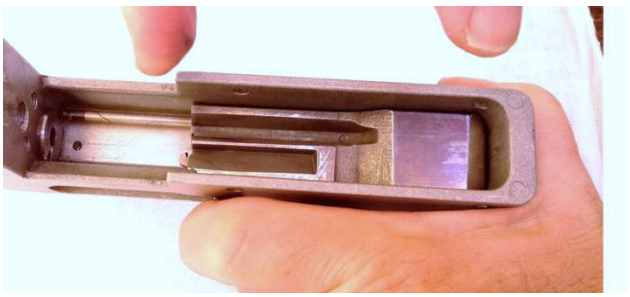


Bolt guide rod placed in anchor well inside receiver.

2. Put a finger in front of the bolt handle inside the receiver and pull the bolt handle all the way back. If it binds, push lightly forward on the outside part of the bolt handle with your other hand to straighten it on the guide rod while you pull the handle rearward.



3. Holding the bolt handle in place to the rear, drop the bolt into the back of the receiver, front edge first. Put slight downward pressure on the bolt and ease the bolt handle forward a fraction of an inch. You will hear and feel the bolt handle snap into its groove in the bolt. Ease the bolt handle the rest of the way forward. If the bolt handle misses its groove and flies forward without the bolt, don't get flustered. It may take a few tries to get the feel for it.

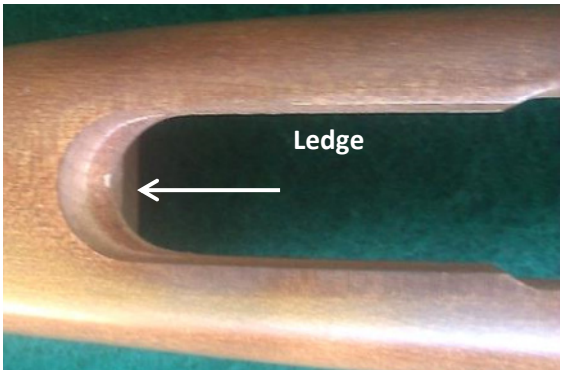


4. Install the bolt stop pin. **TIP:** If you are using a polymer bolt buffer, it goes in easier with a little lube at the end and a twisting motion as you push it. You may also need to align the end with a finger from inside the receiver to get it into the second hole.
5. Pull and release the bolt handle to test the function of the bolt assembly.
6. With the hammer cocked and the safety on SAFE, insert the trigger group into the receiver. Insert the receiver cross pins. Make sure none of the pins falls out while you do this. The magazine release pin can be a rather loose fit and fall out easily.
7. Work the bolt and dry-fire to test the function of the completed action. If you hear a zinging noise, check that the firing pin stop pin is fully in the bolt and not rubbing on the bolt spring.

Task 10: Install the Stock and Protect from Rust

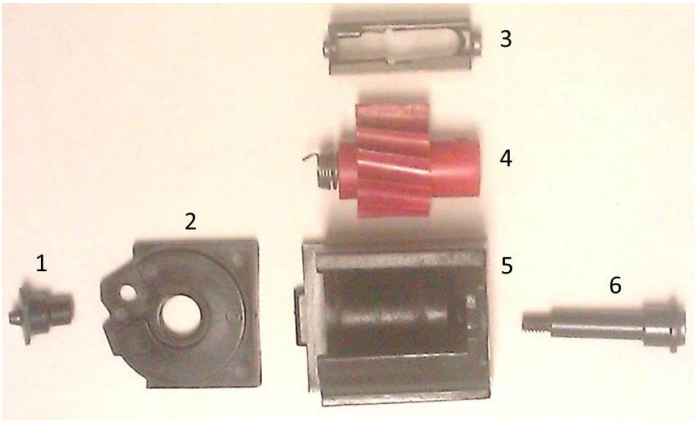
1. Wipe down the entire barrel with a lightly oiled rag to prevent rust. (Gun oil, or your favorite rust preventative). If you put too much oil on the barrel and it seeps into a wooden stock, eventually it will lift the finish from the stock.
2. If you desire, before installing the action, push the action screw all the way up through the stock and put a little blue threadlock on the threads. I prefer to use threadlock than risk over-tightening the screw. **Never use red threadlock** – it is too strong and you'll need a torch to undo the screw.
3. Pull the trigger to decock the hammer, and put the safety in the halfway position.
4. Insert the barreled action into the stock. **TIP:** Hold the barrel at a point forward of the tip of the stock. If you have an International (Mannlicher) stock, you might protect the barrel with a cloth, or wear a clean glove as you handle it, so you don't get acidic fingerprints where you can't wipe them off.

   The action should go in rear first, at a slight angle, so that the shelf at the lower rear of the trigger group fits under its corresponding ledge in the stock. Then lower the barrel end until it is fully inserted in the stock.



5. Tighten the action screw so it is snug.
6. Wipe down the barrel where you touched it, and the bolt handle, with a lightly oiled rag to clean off your fingerprints.

Task 11A: Cleaning the Ruger 10-Round Magazine



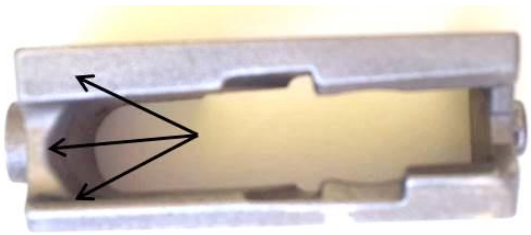
1. Cap nut
2. Cap
3. Throat
4. Rotor with spring inside
5. Shell
6. Screw

Disassembly and Cleaning

Note: There is an excellent schematic parts diagram in the Ruger Instruction Manual (page 28 of the 2013 edition) showing how the parts of the magazine fit together.

The cleaning method specified in the Ruger Instruction Manual is ineffective and messy. It is easy to properly clean the BX-1 magazine and only takes about five minutes.

1. Clean the outside of the magazine, including the magazine throat, with a rag and some solvent.
2. With your hand over the cap nut at the other end of the mag, use a 9/64 hex wrench to loosen the screw. Once the screw is loose, push the screw in; the cap nut should press out of the magazine cap.
3. Remove the cap nut and the screw.
4. Remove the magazine cap.
5. Remove the magazine rotor and spring as an assembly; they do not need to come apart.
6. If the magazine throat does not pop off during steps 4 or 5, remove it now. Note that it has a large nub on one end and a small nub on the other, and which end of the magazine each fits into. The large nub goes into the magazine shell, and the small one fits into the magazine cap.
7. With a rag or Q-Tip damp with solvent, clean out the magazine shell, the magazine cap, and the surfaces of the magazine rotor. The inside of the rotor, where the spring is, does not get dirty.
8. Clean the throat thoroughly inside and out. This is a big source of misfeeds. At the front you may see lead fouling on the feed lips. Use solvent and a brass brush to remove this (see arrows in photo below).



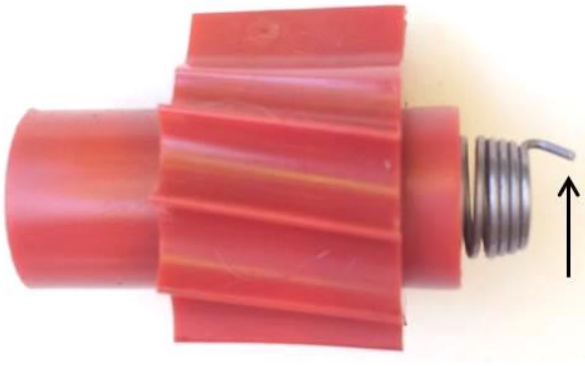
9. Dry all the parts you cleaned. No oil is needed in the magazine. Oil will just attract gunk to create sludge.

Reassembly of the Magazine

Rotor and mag throat inserted in Step 3 (not fully rotated yet).

1. Insert the screw into the magazine shell.
2. Insert the rotor with the long vane facing the left of the mag shell, at the 9 o'clock position.
3. Insert the mag throat. Turn the rotor clockwise until the long vane stops inside the mag throat.
4. Insert the mag cap.
5. Inspect the mag cap nut. Note that there is a hole in the shoulder of its shank. Insert the mag cap nut inside the spring, so that the pointed end of the mag spring seats into this hole. Yes, it's a little fiddly.

Hole in cap nut for spring tip



Tip of magazine spring

6. Hold the mag in one hand with the screw head towards the palm or with a fingertip over it so that the screw does not push out. With your other hand, grasp the cap nut between two fingers and turn it 1⅓ turn (8 "flats" of the nut) – no more – then press it into the hexagonal hole in the mag cap. This preloads the spring so that rounds will feed properly. As you press the nut in place, allow the screw to push back a fraction of an inch at the other end. Press a finger over the cap nut to hold it in place.
7. Tighten the screw so that it is just snug, but do not over-tighten. Over-tightening this screw can cause the rotor to bind inside the case, causing failures to feed.
8. Test the spring tension by pressing on the rotor with a punch. It should snap back when you release it. If it does not, the spring slipped out of its hole in the cap nut - loosen the screw, remove the nut, turn the rotor clockwise until it stops, and re-start at Step 5. Fill the magazine with rounds. If all ten will not go in, you have over-tensioned the spring and must go back to Step 5.

Task 11B: Cleaning the Ruger 25-Round Magazine

Use a 3/32" Allen wrench to loosen the screws. They are captured in the right case half, so do not remove them completely.

1. Magazine throat
2. Follower (pushes rounds up)
3. Spring

Parts shown separated.

Note: Some BX-25 magazines exhibit failure-to-feed malfunctions, many of which can be traced to dirt or bullet lube coating the follower and the magazine throat. Keeping the magazine clean will help. But there are other reported problems with this magazine that are not related to cleaning:

The magazine can be a loose fit in the mag well, allowing it to rock forward and backward. This rocking changes the angle of the feed lips and the height of the top rear edge of the magazine. If the bottom of the magazine is rocked rearward (which pushes the top forward) the rounds can be angled downward and misfeed going into the chamber. In extreme cases, the top edge of the magazine can obstruct the bolt, preventing it from going fully into battery.

I have seen mags that fit too high in the mag well, preventing the bolt from closing more than half-way as it catches on the feed lips.

These malfunctions are rare. Thousands of BX-25 owners have no problems with any of their magazines.

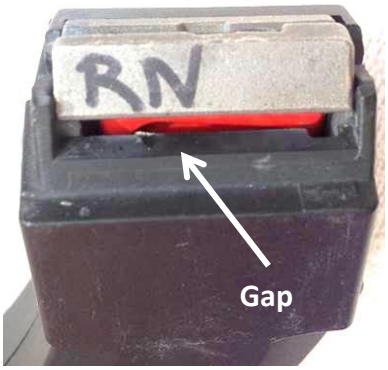
Also, check the rails inside the shell on which the follower rides for burrs or roughness. Smooth with fine sandpaper if needed.

The vast majority of mag problems are due to improper use of the magazine. To help prevent magazine malfunctions, make sure to insert the magazine fully, and rock the bottom of the magazine forward slightly. Also, do not grip the magazine with your support hand, and do not, in prone or benchrest shooting allow the rifle to rest on the magazine.

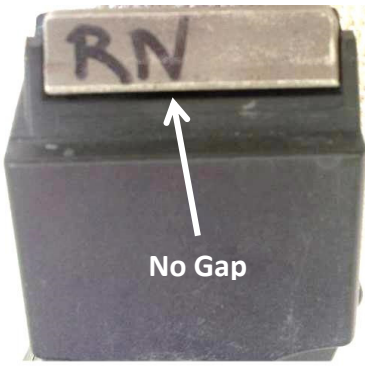
But if you still have problems with yours, contact Ruger.

Disassembly, Cleaning and Re-assembly

1. Clean the outside of the magazine, including the magazine throat, with a rag, brush and solvent.
2. Lay the magazine on its side with the two screw heads facing up. With a 3/32-inch Allen wrench, undo the two screws. They are captured in the case and do not need to be removed. The side with the screws is the right case half.
3. Lift off the right case half.
4. Lift out and separate the magazine throat, spring and follower. Clean the mag throat, follower and the inside of both case halves with a rag and solvent, then dry thoroughly. Use a brush or Q-Tips on the inside of the throat. Make sure it is totally clean, as residue here can cause failures to feed. No lube is required inside the magazine, nor is any desirable.
5. Place the follower in the left case half.
6. Place the pinned end of the spring in its slot in the mag throat. Make sure the curve of the spring fits the curve of its slot. Insert the throat into the left case half, placing the magazine spring bushing onto the pin on the follower. Make sure the mag throat is inserted at the correct angle so there is no gap between the throat and the left case half.



Mag throat incorrectly inserted



Mag throat correctly inserted.

7. Place the right case half on top, with the screws aligned with their holes. The two halves of the magazine should fit tightly together and the screws go in easily. If they do not, the magazine throat is inserted incorrectly. See the photos above. Snug down the screws, but do not over tighten.

YOU ARE NOW DONE. ENJOY SHOOTING YOUR CLEAN, RELIABLE 10/22.

Chapter 7 Customization

The 10/22 can be customized easily to optimize it for nearly any application, or to give it nearly any appearance. Some say that the 10/22 is the Mr. Potato Head of firearms. It is possible to make a 10/22 out of aftermarket parts such that the only part made by Ruger is the magazine. This guide will cover only the most popular functional modifications that owners typically make. In this section I will give my own opinion of the functionality of certain types of accessories, but I will avoid brand comparisons wherever possible.

"OEM" means "original equipment manufacturer" and refers to the standard parts provided by Ruger when the rifle was made.

Before you change anything

It's a good idea to give your new rifle a good "shakedown cruise" before you make any changes. Your initial test period should cover at least 500 rounds (unless a defect becomes apparent sooner), to allow the parts to "break in". There are two reasons for testing thoroughly before any customization:

- You will know your rifle better, and be able to make better decisions about what, if any, changes you want to make for the kinds of shooting you want to do. I learned this the hard way. For example, I wanted to make one of my 10/22s a tack driver, so I bought a 24" stainless steel bull barrel, a fancy thumbhole stock, and a powerful scope. Once I installed them, I realized that the barrel was far too heavy for the 3-position and silhouette events in which I used it, and the stock was not legal in the classes in which I wanted to compete. As another example, the popular CMP Rimfire Sporter competitions require a trigger pull weight of at least 3 lbs.; if you install a lighter trigger, it will be disqualified.
- If the rifle does have quality issues that require Ruger to make warranty repairs (see note below on Ruger's "warranty"), you want them corrected before you buy expensive parts for it. Ruger make very clear in their Instruction Manual and on their customer service web page that they will replace any non-original parts on rifles they repair with OEM factory parts, and will not return your aftermarket or modified parts.

Ruger does not have a written warranty on its firearms. You can read their statement about it in their Instruction Manual. The statement ends with "Sturm, Ruger & Company wishes to assure its customers of its continued interest in providing service to owners of Ruger firearms." In practice, if you have a problem with your 10/22 due to a manufacturing defect, Ruger is very good about repairing it at no charge. You will have to contact them first to get a Return Material Authorization number. See the Customer Service section of www.ruger.com for details.

What should you look for during your initial testing of your new 10/22? Following are some of the basic issues that new owners have found. Note that defects are rare, but they do sometimes happen.

- Ensure the bolt moves smoothly, consistently ejecting spent cases and loading new rounds cleanly into the chamber, and that it closes completely into battery.
- Ensure that the safety works every time. Remember the hammer must be cocked in order to fully engage the safety.
- Ensure the bolt does not scratch, score or shave the next round in the magazine. This could be due to a burr or sharp edge on the bottom of the bolt, or to improper seating of the magazine.

- Ensure that with the rear sight centered, the rifle shoots to point of aim. There have been reports of front sights installed at a cant (diagonal) that causes the rifle to shoot wide to the right or left.
- Ensure that the extractor does not bind in its slot in the barrel.
- Ensure that the firing pin makes consistent hits on the case rim

Functional Accessories and Modifications

There are many makers of aftermarket customization parts for the 10/22. The guide below mentions only a few of the most popular ones. You can see a wider range of suppliers in the Sponsors Area of rimfirecentral.com.

Sights and Scopes

The OEM blade sight system can be hard to use in low light and for those with aging eyes. Replacing it with a red dot sight, scope, or aperture sights is an easy solution. There is good reason that the US military adopted aperture sights beginning with the M1 Garand in 1936. The most popular aperture sights are made by Tech-Sights, Nodak Spud, Skinner, and Williams.

If you install a scope, make sure to get scope mounts that place it far enough forward to give you proper eye relief for your scope. If you see a dark ring around your scope image instead of a full, circular view of your target area, your eye is too close to the scope. Put the scope on its highest magnification. Experiment with different distances, then when you have the best view, measure from your eye to the rear of the scope. Then get into shooting position (prone typically puts your head farthest forward) with your head comfortably on the stock. The scope should be set at the distance you measured. Double-check the view and adjust as needed. For most scopes, you want the back of the scope to be no farther back than the rear edge of the receiver. You may need to install a rail that extends out over the barrel to get the scope far enough forward. You also need scope rings that are high enough for the objective lens to avoid contacting the barrel.

Stock

Shown is the standard Ruger 10/22 carbine stock. Important parts of the stock to consider are:

- **Comb:** The comb is the top of the buttstock. Your cheek rests against it, so its height determines how your eye aligns with the sights. The stock is designed for a good check weld with the factory sights. Depending on how high your sights or scope are, you may not be able to get a normal “cheek

weld" for sight alignment. The rifle above is equipped with aperture sights that are taller. I have become accustomed to putting the comb a little lower on my face when using it. If you install a scope or aperture sights, you will probably find the comb of the stock is now too low by .5 – 1.5 inch. You can replace the stock with a raised comb type ($80-$200+), or add a comb riser such as the Accu-Riser ($35) the Rimfire Essentials Adjustable Comb Extension ($24), or the Beartooth Comb Raising Kit (about $30).

- **Length of Pull:** The distance from the butt to the trigger is called the "length of pull". Ruger standard stocks have length of pull ranging from 12.75" (Compact model) up to 13.88" (Deluxe Sporter). Most models have a 13.50" length of pull.
- **Forend:** The OEM stock has a rounded forend. It is very comfortable for holding in your hands. But if you shoot from a bench, you would prefer a stock with a flat forend for stability.

There is an enormous variety of stock designs for the 10/22. Some of them are quite beautiful. While many of the different features are cosmetic , some others optimize the rifle for certain uses. For example, a heavier stock with a flat forend and thumbhole or pistol grip would be good for benchrest shooting, but may not comfortable for position shooting and is not eligible for hunter class silhouette, ABRA Factory class, or CMP Sporter competition. A "tactical" stock with 6-position buttstock varies the length of pull, making a versatile rifle than can be shared by adults and children alike.

In 2014 Ruger introduced the 50th Anniversary model of the 10/22. This version has a stock with interchangeable modules for the buttstock to provide different length of pull and comb height. This feature is very convenient and saves having to buy a stock if you change your sighting system or outgrow the compact size.

Sling

Many slings are just a way to carry the rifle on your shoulder. Some of the "tactical" slings, such as are used on modern military rifles, are equally a way to carry the rifle comfortably in the ready position close to the chest. But a classic, military-style (GI web or 1907) sling is not only a handy way to carry your rifle, but is a highly effective shooting aid that helps you hold the rifle steady in any position. It is essential if you want to train or compete in position shooting (Appleseed, NRA or CMP 3-Position events). The most effective slings for this purpose are the GI web sling (1.25" width, made of cotton canvas, about $15) and the 1907 type (leather) sling ($50-60).

If you buy a web sling, avoid the narrow, slick nylon slings, which tend to slip down your arm while shooting. The 1.25" width, leather 1907 sling used in high-power rifle competition is highly effective; but cosmetically, its size can overwhelm the 10/22 stock. Boyt Harness makes a nice 1907 sling in 1" width that looks and works great on a 10/22. It's on my personal Appleseed/CMP rifle. If you buy a leather sling, make sure it is real leather and not "bonded leather", which is the leather equivalent of chipboard.

If your 10/22 did not come with swing swivel studs (or the built-in swivel on some stocks) you will need to install studs and purchase swivels to attach the sling. This involves drilling into the stock which must be done with great care. When installing swivel studs, it is best to use a drill press and to set the stock in a fixture to hold it perfectly vertical. It also helps to put epoxy on the screw threads so that the studs do not work loose over time. If you are not comfortable with this sort of woodworking, have a gunsmith do it for you.

Some companies sell a barrel band adapter to mount a sling stud to the barrel band. I recommend against using this. It will pull the barrel downward and ruin the rifle's accuracy.

Magazine release

The flat OEM magazine release on some models has to be pressed upwards into the stock to operate, which requires gripping your hand over the stock. There are many different models of extended mag release that you can push forward with a finger. These are much quicker and ergonomically efficient. But some owners prefer the flat mag release as it cannot catch in brush while hunting.

Bolt Guide Rod, Handle and Spring

Aftermarket bolt guide rods are smoother than the Ruger OEM rod, and often have extended or differently profiled handles that make them more comfortable to pull back, especially if you are using the one-hand method or have a scope. You can also get an extended bolt handle alone but installing it requires modification of your guide rod – grinding off the wide part at the front to allow the spring and handle to be removed.

You can also get recoil springs of different strengths so that the rifle will function optimally with specific types of ammunition. A lighter spring will allow sufficient bolt travel with standard or subsonic velocity ammunition, but might not work well with high velocity ammo and could even cause failures to eject or case blowouts as described in the Malfunctions chapter. Conversely, a lighter round might not cycle the bolt fully if a stronger spring is used. You will want to select a type of ammo that fits your style of shooting, use the correct spring for it, and stick with that formula.

Bolt Buffer

Many owners replace the OEM bolt stop pin with a polymer buffer to reduce noise and shock when the bolt cycles back after a round is fired. It's a small thing but does make shooting more pleasant. Buy carefully – some suppliers charge $10 or more for this simple part. Tactical Solutions has a urethane buffer for about $5.00. Kidd makes a very good buffer with a Viton rubber sleeve over a steel core that is easy to install and guaranteed for life for about $6.00. The rubber sleeve compresses to enter the holes in the receiver easily, and is then stiffened by insertion of the steel core.

Auto Bolt Release

The OEM bolt release requires manipulating the lever for both locking and releasing the bolt – a two-finger, if not two-hand, operation as described in Chapter 3. With an auto bolt release, you can release the bolt simply by pulling the bolt handle back and releasing it to spring forward like a slingshot, without pressing the bolt lock blade.

You can buy an aftermarket auto bolt release and there are many to choose from, or you can make your own by filing out the heart-shaped hole in the OEM bolt lock to a rounded profile. There are a number of YouTube videos that show how to do this. (Some are good, some are bad.) **TIP:** If you do your own, use a hand file, not a Dremel. You can't put material back on if you go too far. The photo below shows the different shapes of the hole in the OEM and modified bolt release:

1. **Ruger OEM bolt lock. Note point at top of hole. This prevents bolt from releasing unless the blade is pressed in.**

2. **Modified bolt lock. Hole has rounded contour, made in ten minutes with a curved diamond file. Allows bolt to slide forward without pressing blade**

Enhanced Triggers

The OEM trigger is notoriously heavy and creepy. I have seen pull weights from 5 – 10 pounds. There is a wide range of aftermarket solutions.

Installing an enhanced trigger can give you a crisp, light trigger pull of 1.5 - 3.5 pounds. At least one 2-stage trigger (Kidd) can give pull weights under one pound. You can spend $200 or more on a complete trigger group. Or for about $100, you can get a replacement hammer, sear, and spring kit. For about $50 you can get a replacement hammer and spring kit. The most popular makers of trigger and hammer parts are Kidd, Power Custom, Rimfire Technologies, and Volquartsen.

You can also have your OEM trigger group modified by a gunsmith (a "trigger job"), or if you are experienced and knowledgeable at gunsmithing, you can do it yourself (but then you probably wouldn't be reading this guide). Brimstone Gunsmithing (brimstonegunsmithing.squarespace.com) is a nationally well-known specialist in 10/22 trigger jobs and Swampfox does excellent work also.

Some owners install thin shims between the rotating trigger and hammer parts. These reduce any sideways motion of the parts, and act as bushings to smooth the rotation of the trigger, disconnector and hammer around their pivot pins. Sources of these include Brownell's and triggershims.com.

Finally, you can upgrade from the OEM plastic trigger to a metal (aluminum or titanium) trigger; several different profiles are available, and many different colors from several manufacturers. Some triggers also have adjustable overtravel stops to limit rearward movement after the shot fires. You can also make your own overtravel stop by drilling and tapping a hole in the rear of the trigger guard and inserting a set screw. If you do this, make sure to allow enough travel for the trigger to reset properly.

Action Polishing

For safety reasons we will not cover sear/hammer modifications here. But you can lighten your trigger pull and improve its feel by polishing and removing sharp edges and burrs from certain parts. Keep in mind that you don't want to remove too much material from these parts – you only want to make them smooth. Smoothing and polishing the bolt and receiver will also improve functioning.

Hammer Strut: The hammer strut is a stamped part. One side of it has a rounded edge, and the other is sharp. Smooth the sharp edge of the round end (which rides in the hammer slot) so that it does not catch and drag on the hammer.

Hammer Surface: The forward surface of the hammer may also be roughly finished. Polishing this will improve contact with the firing pin and also help the bolt glide over the hammer.

Bolt: The top of the bolt slides against the receiver, and the bottom rear of the bolt slides over the hammer. These are both typically rather rough with many tool marks from machining. Polishing these surfaces to a mirror finish will reduce friction over the hammer, the ejector and the magazine.

Radius the bolt: The bottom rear edge of the bolt is rather square with a small radius. This section contacts the hammer to cock it as it slides rearward. By sanding this edge to a larger radius (making it more round) the bolt will glide more easily over the hammer. This improves bolt function while shooting and also makes it easier to work the bolt by hand. It is almost mandatory if you want reliable cycling with very low velocity ammunition.

Receiver: The inside of the receiver often has a rough surface due to casting marks and paint overspray. You can smooth this with a mild Scotchbrite pad and some oil. Be careful not to take off any material; you just want to make it smooth.

Bolt Guide Rod: You can also use a Scotchbrite pad or fine sandpaper and oil to smooth the OEM bolt guide rod. Press the handle down to compress the spring as far as possible, and work over the area above the handle. You want it smooth and even, but without taking off any thickness. Anything you can do to reduce friction will reduce the chances of a failure to eject.

Accurizing and Customizing the Barrel and Bolt

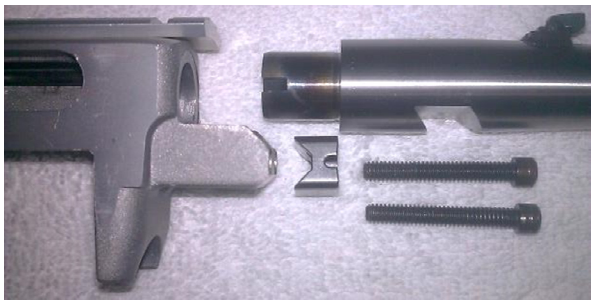
Ruger barrels are very well made and quite accurate. However, the chambers are typically rather loose to ensure reliability with a wide range of ammunition. A more precise fit of the round in a “match” chamber improves accuracy. There are many makers of replacement barrels with match-grade chambers; the most popular include Feddersen, Green Mountain, Kidd, Lilja, Shilen, Tactical Solutions, and Volquartsen. The variety of barrel styles available is far too complex to detail here. Whatever your need may be for light or heavy weight, length, accuracy, balance, threaded muzzle (for a suppressor, compensator, or flash hider), or cosmetic features, there is a barrel out there that is right for you.

Keep in mind that if you have a standard taper Ruger barrel and want to get a thicker profile such as a .920 diameter bull barrel, you will have to modify or replace your OEM stock to fit it.

If your rifle will get used roughly, such as being loaned to beginners or carried while hiking, you may want to get a threaded barrel and install a flash hider – this will protect the muzzle crown from damage. The Ruger 50th Anniversary model (introduced in 2014) and the Tactical model come with a flash hider as a standard feature.

The Ruger OEM bolt is also known for being a loose fit in the receiver and has many machining marks both on the top where it slides against the top of the receiver, and on the face where it seals against the breech face of the barrel. Also, the headspace tolerances are fairly wide, again to accommodate a wide range of ammunition. All of these factors affect accuracy and consistency. To smooth operation, you can polish the sliding surfaces of your bolt yourself, but this does not improve the headspacing or sealing

against the breech. Kidd, JWH Custom and Volquartsen among others make replacement bolts that are manufactured to high-precision tolerances and very well finished.



Less expensive (by about half) than buying a new barrel or bolt is to have your OEM parts modified by a qualified gunsmith. Well-known specialists in this kind of work include Que's Bolt and Barrel Rework (https://sites.google.com/site/quesplace/) and Connecticut Precision Chambering (www.ct-precision.com). Many owners (including me) report significantly improved accuracy from these services.

Replacing the Barrel

The 10/22 barrel is very easy to replace. It is a slip fit, not a screw-in type. The barrel shank slips into the front of the receiver; the barrel is held in place by a V-block that captures a groove in the bottom of the barrel and screws into the receiver. There are a few details that require your careful attention. Remember, each time you remove or adjust the barrel, you will have to re-zero your sights or scope.

Removing the Barrel

1. Remove the barreled action from the stock. See Task 2.
2. Remove the bolt and charging handle assembly. This is important. The extractor fits into a slot on the right edge of the barrel shank. If you twist the barrel with the bolt forward, you will bend the extractor and have to buy a new one. Also, you do not want the bolt to hit the front of the receiver.
3. With a 5/32" Allen wrench (hex key), remove the two screws from the V-block. They are long. Be careful not to scratch the barrel with the end of the wrench. You may want to put masking tape on the barrel where the wrench and screws might contact it. Pull the V-block away from the receiver.
4. Pull the barrel out of the receiver. If it is tight, you may have to twist it slightly back-and-forth as you pull.

Installing the Barrel

1. The procedure for installing the barrel is exactly the reverse of the removal procedure. If your barrel slides in easily, skip to step 4 below.
2. If you are installing an aftermarket barrel, follow the instructions that came with your barrel. Some barrels, such as Tactical Solutions, are made with an oversize shank that requires slight sanding to fit into the receiver.
3. It is a good idea to put a thin coat of anti-seize compound on the barrel shank. Most aftermarket barrels do not require sanding, and doing so would damage the barrel and void your warranty. But they are still a very tight fit and may not go in for you. For these, you may need to strip the receiver (through Task 4 on page 9) and heat it slightly in a warm (not hot) oven to expand the barrel hole. You can also freeze the barrel to shrink it slightly. The barrel should then slide easily into the warm receiver.

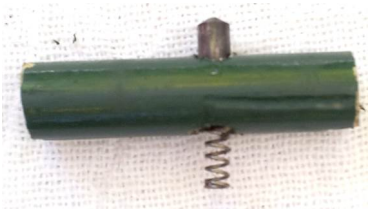
4. Once the barrel is fully inserted, make sure that it is correctly oriented. Ease the bolt forward to ensure that the extractor fits into its slot without rubbing. If your barrel has a front sight, check to make sure it is straight up and not canted to either side.
5. Insert the V-block and screw it in place. I use a little blue threadlock here as well. It does not take much pressure – **10-12 inch-pounds is the recommended torque**. Remember, the receiver is aluminum and over-torqueing these screws can easily strip the threads.

The Safety: Removal and Installation

In normal use you should never have to remove the safety for maintenance. I suppose if your rifle were buried in mud or fine sand…. Or if you prefer to replace the OEM safety with a large-button or left-handed model, here is how to do it. Remember, the OEM safety is not reversible. If you install it backwards, it will not work properly and your rifle will be unsafe.

You will need some special tools to remove the safety:

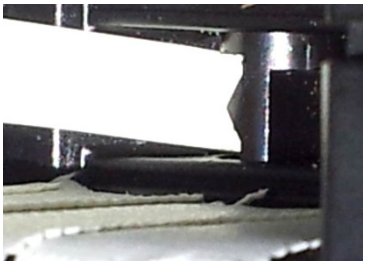
- Gunsmithertools.com makes an excellent combination tool that enables you to do this job easily.
- You can also make your own safety installation tool from a wooden dowel or pencil. The safety is .310" in diameter – your tool should be as close as possible to that thickness, but no thicker. The photos below show my DIY tool made from a pencil. It is 1 1/8th inch long, with a 1/8th-inch hole through the middle.
- If you make your own tool, you will also need a 1/8th inch punch and a 1/16th-inch punch.
- Needlenose pliers.
- A bag to work in as you remove the safety. The safety plunger spring is very strong. The plunger could launch into orbit if you do this step in the open. You don't want to spend two hours searching for these small parts.



My home-made safety tool showing plunger inserted in hole

Removing the Safety

1. Remove the trigger group and completely disassemble it as shown in Chapter 7, Task 7. Now you have a stripped trigger group housing except for the safety.
2. Put a finger on each end of the safety and rotate it slightly forward. This exposes the detent slot at the bottom of the safety. From the rear, insert a 1/16th-inch punch below the safety and press the detent plunger down. Use your punch as a lever to rotate the safety forward until it is about 90° from normal and the plunger is covered by the round barrel of the safety.



Viewed from above with paper inserted for contrast. The left side is at the top of the photo:

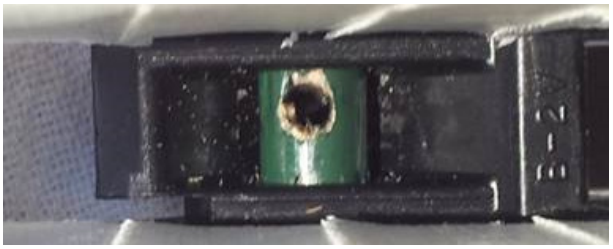
Safety has been rotated 90° forward so that plunger is captured under the round side of the barrel. The flat spot is to the right and the scalloped cutout for the plunger is to the left. Do the next step, pushing the safety out, inside a bag to prevent losing the plunger and spring.

3. With your hands carefully covering the top and front of the housing, or working inside a bag, push the safety from left to right until it is clear. You may have to use a punch if it is stiff. Do not rotate the safety as you push it – you don't want the plunger to become trapped in either slot. When the plunger is released, it tends to fly up and forward of the housing, so you will want to aim it towards the inside of the bag.
4. Put the safety, plunger and spring in a parts dish, cleaning as necessary. You may want to clean the bottom of the housing under the safety if needed.

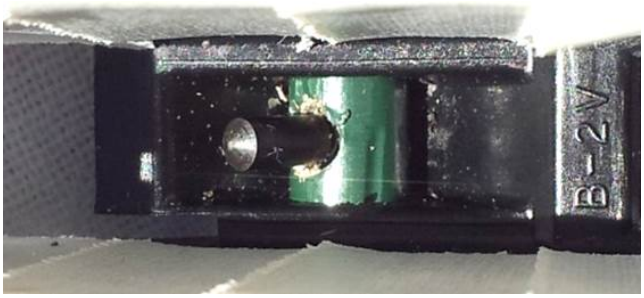
Working in a bag to push the safety out of the housing.

Installing the Safety

1. Insert your safety installation tool and line up the hole with the hole in the housing.



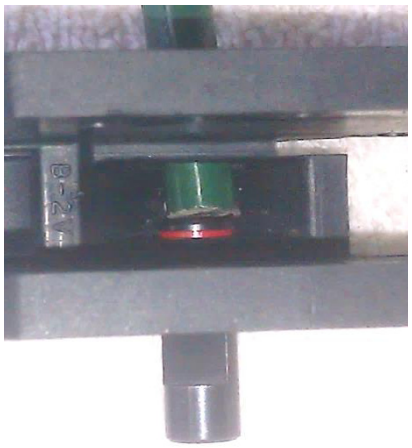
2. Insert the plunger spring into the bottom of the plunger. Push it all the way in.
3. With pliers, insert the plunger/spring into the hole in your tool. Push it in to make sure the spring is seated inside its hole in the housing.



4. With your 1/8th-inch punch, press the plunger down until it clears the installation tool. Using your punch as a lever, rotate the tool 90° rearward. Now the plunger is captured under the round barrel of your tool.

Tool is rotated so hole faces rear of housing to capture plunger underneath it

5. Make sure the top part of the safety (with the large, flat cutout) is facing up. Press the end of the safety against the end of your tool. It is important that there be no gap between them as they go through the housing, or the plunger will spring out. The tool will function like the cheater pin did in installing the trigger pivot pin, and be pushed out. Push the safety all the way through until the plunger clicks into the detent slot of the safety.



Safety pushing tool through the housing.
Note the flat cutout is facing up.

6. Test the safety. If it isn't clicking positively into place or is failing to hold its place in the FIRE and SAFE positions, make sure that it is not rotated such that the plunger is not seated properly in its detent slot. Remember, the flat cutout on the top of the safety should be facing up.
7. Once you are sure the safety is correctly installed, re-assemble the trigger group as shown in Chapter 5, Task 8.

Chapter 8 Resources for 10/22 Owners

This list below is not meant to be a complete list, and reflects the personal opinions of the author.

Parts and Accessories Suppliers

Brownells.com: Online dealer of OEM parts, upgrade parts, and accessories from a number of manufacturers. Known for large selection and outstanding service.

Coolguyguns.com: Website of Tony Kidd, maker of very high quality upgrade parts for 10/22s including barrels, actions, triggers, receivers and small parts. Widely considered the best 10/22 trigger groups and parts.

Gunsmithertools.com: Maker of specialty tools for working on the 10/22, including three tools that I think are terrific because they make the job easier, quicker and almost idiot-proof:

- The Safety Tool, which also contains two sizes of punch and a cheater pin, handles every task on the trigger group in addition to being the perfect tool for working on the safety.
- The Bolt Bar, to compress the bolt guide rod spring when installing the bolt, also contains a great tool for removing/installing the extractor.
- The Brush n'Mop chamber cleaning tool has a wire brush and a mop, set at an angle so you can clean the chamber without removing the bolt.

Midwayusa.com: Online retailer of a wide range of parts and accessories

Nodakspud.com: maker of the Nodak sight system, another popular aperture sight for the 10/22. Also makes upgrade receivers.

Rimfireessentials.com: Online specialist selling .22LR rifles and accessories, including the Adjustable Comb Extension for raising the comb to accommodate aperture sights or scopes on your OEM stock.

Rimfiresports.com: Online retailer of upgrade parts and accessories for all kinds of rimfire firearms. They have all-metal .22LR dummy rounds that are some of the best snap caps I have seen for ball-and-dummy training.

Rimfiretechnologies.com: Maker of wide range of action parts, particularly known for trigger group parts

shopruger.com: Ruger factory website for OEM parts and accessories.

Tech-Sights.com: maker of Tech-Sights, the most popular aperture sight upgrade for 10/22s, also sells good web slings.

Volquartsen.com: probably the largest maker of upgrade parts including everything except magazines.

Stockysstocks.com: sells a wide variety of stocks.

Ammoseek.com: A search engine for finding the best deals on ammo nationwide in the US. Especially useful in searching for match-grade brands.

Don't forget Amazon for a wide range of parts, tools and accessories, and Ebay where you can find good bargains on used or "new take-off" parts sold by people who added aftermarket parts to their rifles.

If you are looking for a barrel, search on the several makers' names in the Accurizing section of Chapter 6.

Internet Discussion Forums and Websites

Rimfirecentral.com: the most comprehensive site for discussion of rimfire rifle and pistol gear - especially 10/22s – customization and maintenance how-to, competitions, anything involving rimfire rifles and pistols. Conducts on-line matches in a variety of disciplines. Best of all, no political discussions or antagonistic behavior are allowed. This is where the experts hang out. Some of the members have taken the improvement and customization of 10/22s to an amazingly high level.

Rimfireshooting.com: an active site, especially for discussions of CMP Sporter competition. Based in Alabama, also holds monthly in-person silhouette and target matches.

AR15.com: This is the largest forum for EBRs (Evil Black Rifles). It has an active section (under Armory) for 10/22s and other rimfire rifles, including an interesting discussion about using the 10/22 as a money-saving training substitute for your centerfire service rifle.

http://forums.accuratereloading.com/eve/forums/a/tpc/f/8711043/m/9871088921: A rigorous test under controlled conditions of the accuracy of over 40 different types of .22LR ammo at 50, 75 and 100 yards. Most of the brands tested are fairly expensive "match-grade" ammo, but a few brands of "bulk" ammo are tested and the results are quite interesting.

www.rrdvegas.com/rimfire-cleaning.html: Rimfire Research & Development is a website about the technical aspects of rimfire shooting. It has the most comprehensive, fanatically rigorous explanation of barrel cleaning that I have seen yet.

http://looserounds.com/2013/02/09/rifle-barrel-cleaning-method-for-precision/: This excellent blog article about cleaning is written for centerfire rifles, but much of its wisdom applies to rimfire as well.

http://ronkulas.proboards.com/thread/274/review-comparison-gun-care-products: A rigorous and complete test of the lubricity and rust prevention ability of 33 different gun lubes. This is the best test of its type I've seen so far.

Chapter 9 Sporting Events for the 10/22

Most 10/22s are used for casual plinking, varmint control, and small-game hunting. But there are several challenging shooting sports that are tailored for semi-automatic, smallbore rifles, and the 10/22 is very competitive in them. You might want to check these out to get even more enjoyment from your fine rifle.

CMP Rimfire Sporter 3-Position

The Civilian Marksmanship Program, which sanctions top-level competitive shooting events nationwide and runs the annual National Matches at Camp Perry, Ohio, also sanctions a competition for .22LR rifles. The Rimfire Sporter match is designed to be a low-cost sport that everyone can enjoy. It has tight restrictions on equipment – no bull barrels, no fancy stocks, no specialized shooting jackets or gloves are allowed, and the trigger pull weight must be at least 3 pounds. There are three classes: one for rifles with scopes or aperture sights, one for open sights (factory style) and one for "tactical" style rifles.

The match course of fire is 30 or 60 shots in six stages – four at 50 yards and two at 25 yards. There are both slow and rapid fire stages. Standing, sitting, and prone positions are used.

For more information, see the CMP site: www.thecmp.org/NM/Rimfire.htm

Project Appleseed

Appleseed is a unique program whose mission is to enable and motivate people to become informed, active participants in their government, a right for which the Founders sacrificed their lives and their fortunes. Appleseed combines marksmanship and history, specifically understanding the story of the first day of the Revolutionary War, to rekindle the spirit of the original American patriots in today's citizens.

Appleseed is an instructional program, not a competition. It is one of the largest shooting instruction organizations in the US, teaching thousands of shooters annually. The standard 2-day program teaches long-range marksmanship using the same principles and methods taught by the US military for most of the 20th century. These skills are the same as those used in smallbore and high power rifle competition today. It teaches how to use proper position for standing, sitting/kneeling, and prone, and the skills of sighting, breathing and trigger control to make consistent, accurate shots. Shooters who score at least 210 out of the possible 250 points (the same level as "Expert" in the military) earn a "Rifleman" patch.

The standard Appleseed course of fire uses a version of the military "D" silhouette target, scaled to replicate actual distances of 100 to 400 yards, but it is shot at 25 meters distance. Most participants use .22LR rifles, of which the 10/22 is the most popular.

Appleseed is especially family-friendly, but it is not just for children. Appleseed instructors also provide high-level coaching to shooters of almost all skill levels, and many military members participate in Appleseed events. Some clubs around the country are beginning to institute competitive matches for .22LR rifles using the Appleseed course of fire.

For more information see www.appleseedusa.org.

Auto Bench Rest Association

The Auto Bench Rest Association was created in early 2014 in Texas. It is growing rapidly, with clubs in six states preparing to host matches. ABRA is designed as an inexpensive alternative to the all-out technical contest of ARA benchrest shooting (for which the rifles can cost thousands of dollars). It is also designed to be openly and evenly competitive to shooters of all ages and physical abilities. The program emphasizes family participation – kids shoot free – and is reaching out to veterans organizations to establish adaptive events for our wounded warriors.

All .22LR semiautomatic rifles are eligible, and the 10/22 is the most popular. The course of fire is a 20-bullseye target at 50 yards distance, one shot per bull. It is challenging: the 10-ring is barely 1/8" inch in diameter. There are two classes: Unlimited, which means what it says – lots of highly customized "space guns" on the line; and Factory, which is designed to be inexpensive. Factory class rifles must use factory barrels, stocks, and receivers but some improvements to the muzzle crown, chamber, bolt and trigger group may be made.

For more information, see here: www.autobenchrestassociation.com/

NSSF Rimfire Steel Challenge

This is a speed game. You shoot 5 steel targets, set up in varied arrangements at distances from 10-25 yards, of which one is a "stop plate" – hit the stop plate out of order and your string is over. The fastest time for all five targets wins. You may shoot more than five rounds per stage, and there are time penalties for missed targets. Normally in each stage you will shoot five strings and the average time for your four best strings is your score. Ruger created this event and in 2014 turned it over to the National Shooting Sports Foundation as the sanctioning body. There are club and regional events as well as a national championship. The Steel Challenge is for both rifles and pistols in .22LR only.

For more information go here: http://www.nssf.org/rimfire/

NRA Smallbore Silhouette

Shooting at steel silhouette targets (chickens, pigs, turkeys and rams) at distances from 44 to 110 yards (40 – 100 meters), in standing position, no sling allowed. The course of fire for registered matches can range from 40 to 120 rounds. This is a very challenging game – the body of the 110-yard ram target is only 3" x 5" in size .There are two classes, the Smallbore Rifle class and the Smallbore Hunter class. The latter is for traditionally-styled rifles and prohibits rifles exceeding 8.5 pounds, thumbhole-style stocks and bull barrels. The Hunter limitations are designed to keep the cost of competing down. Under NRA sanction, matches are registered for national ranking.

For more information see the NRA Silhouette Programs site: http://compete.nra.org/news-and-events/silhouette-programs.aspx.

I hope you have found this guide useful. Please send any comments to info@1022Companion.com

Please visit the 10/22 Companion blog at http://1022Companion.wordpress.com, where I post regular updates and new topics about my shooting adventures with 10/22s.

The End