Maintenance and Troubleshooting Of AR-15-Type Rifles

Whether built by Colt, another quality gunmaker, or assembled on the owner's kitchen table from parts, some simple procedures and helpful aftermarket parts can keep the AR firing smoothly.

by Dennis A. Wood

When first introduced to our troops as the M16, the AR-15 was scorned as a combat-rifle replacement for the M14. It's taken four decades, along with changes in bullet weight and barrel twist, but the AR-15 has come to earn respect from military units, hunters, law-enforcement agencies, and high-power-rifle competitors.

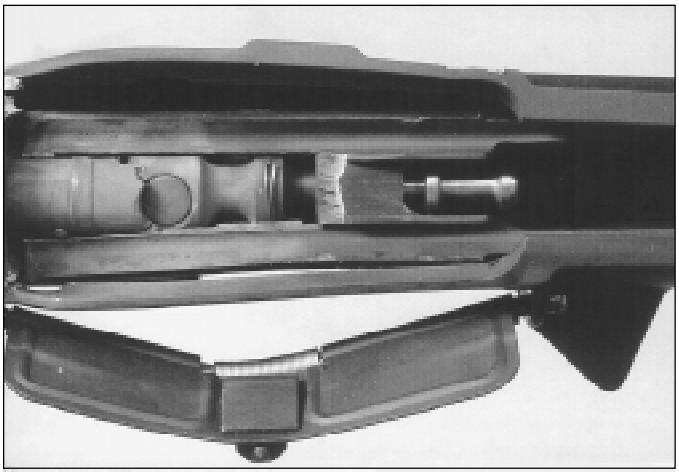
The civilian version of the M16, as produced by Colt and various other manufacturers, is the semi-auto AR-15 available in .223 Remington (5.56mm NATO) caliber. Since "AR-15" is a registered trademark of Colt Firearms, I'll use the term "AR-15-type rifle" to refer to the Colt as well as the other clones and variations from numerous makers.

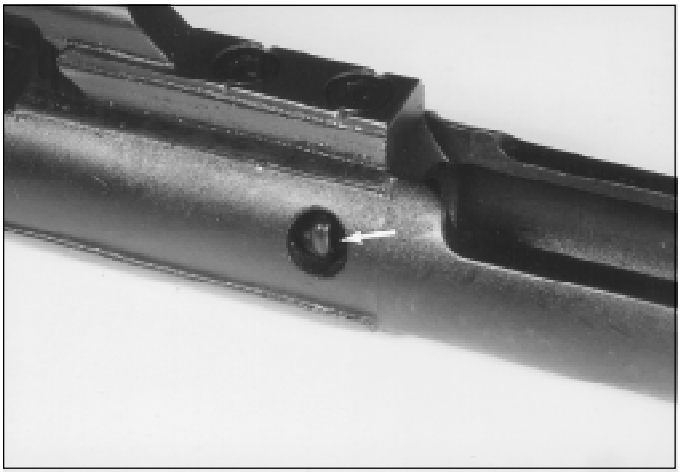
Because of the "assault-rifle" legislation enacted in 1994, restrictions were placed on some of the features of this rifle such as muzzle attachments, bayonet lugs, and magazines with a capacity exceeding 10 rounds. These restrictions never made sense to me or to owners of such firearms. If you had a pre-ban AR-15-type rifle in your possession, you were free to keep it and replace parts as necessary. To stay within legal limits, manufacturers that produced civilian versions of the "black rifle," "mouse gun," or any of the other names given to the AR-15 clones, needed to produce a civilian-legal style that complied with the regulations. In 2005, the federal ban on those specific attachments expired, although a few states chose to continue the ban on such features for citizens residing in those states.

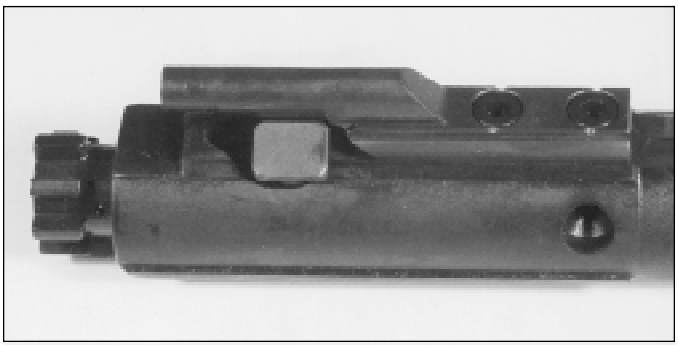
Today, the AR-15-style rifle is more popular than ever, with a large number of manufacturers producing complete rifles as well as upper units in calibers from .22 rimfire to the .50-caliber Beowulf. When you add in the mind-boggling array of accessories to complement this style of rifle, the AR-15 becomes almost an industry all by itself.

In the last (November 07) issue, Chick Blood discussed the assembly and reassembly of the Sabre XR-Series—a high-end variant of the AR-15 type. In this issue, I'll cover the takedown of AR-15 types briefly in a more "generic" way, concentrating on the maintenance routines and basic troubleshooting. If you run into any nomenclature problems, you can refer

Below left: *Even though this AR-15's alloy receiver was blown up, it held together well enough to prevent injury to the shooter.* ***Below right:*** *The firing-pin retaining pin has a looped end that can be pulled out with a small flat-blade screwdriver.*







Above left: *Push the bolt head backward and rotate the firing-pin cam pin to remove it from the bolt.* ***Above right:*** *Stagger the gaps in the gas rings. If they're lined up, gas could blow them.*

to the schematic on page 5 in last month's issue.

Field Stripping

Once understood, the takedown procedure for an AR-15-type rifle is pretty simple and straightforward. The rifle depicted here is the Bushmaster XM15 V Match—one of the better examples of what's currently available. The first step, as always, is to remove the magazine and pull the charging handle backward to clear the chamber. Peer into the action and chamber to visually verify that you're dealing with an empty firearm. Because we'll be dealing with detent pins retained by springs and drifting out spring roll-pins, safety glasses should be worn.

For me, it works best to begin by clamping the barrel between protected jaws in my vise, with the butt end of the rifle pointing to the right and upward at around a 20-degree angle from the bench top. Cock the hammer back by pulling on the charging handle and place the safety in the "on" position. Push the rear takedown pin in from the left side of the lower unit until the lower unit pivots downward. With a tight assembly of the upper to the lower, you may need to push this pin out with a Nylon or Delrin pin-pushing tool. Don't attempt to drive the rear takedown pin completely out of the lower unit. This pin is maintained in the lower by a detent pin and spring, so if you try to drive it completely out of place in the lower unit, you'll break a very thin wall for the detent pin and spring channel along the right side of the lower unit. Next, to separate the upper from the lower unit, the front pivot pin is pushed forward until the pin is captured by the detent pin in the right side of the lower unit.

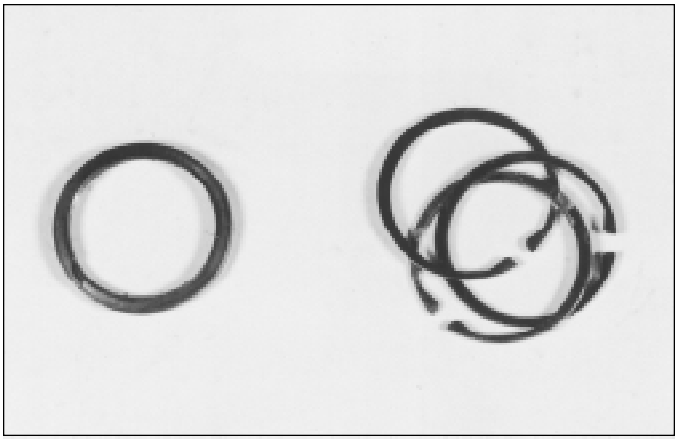
Disassembly of the Receiver

AR-15 receivers are typically made of 7075-T6 forged aluminum alloy, with the principle alloying element being zinc for corrosion resistance and a small amount of magnesium to increase strength. The T6 designation denotes that the receiver has been heat-treated, meaning that the material is artificially aged at around 300 degrees F to increase hardness and tensile strength.

The strength of these receivers is truly amazing, as I had the opportunity to discover a short time ago. A customer arrived with his AR-style rifle and a very bleak story. He'd put together some hand-loaded ammunition with new Winchester .223 Remington cases and 75-grain bullets. The first round he fired ruined the receiver completely; the escaping gas vented out the primer pocket of the cartridge case, blowing off the bottom of the bolt carrier and destroying the magazine. Fortunately, he wasn't hurt. I was curious to know if he still had any of the ammunition that he loaded. After pulling a bullet and examining the powder charge, I found that instead of using 24 grains of a proper rifle powder, several 24-grain charges of pistol powder had been left in the bottom of his powder measure from a previous loading session. The pistol powder was thrown before he got to the rifle powder he poured in on top of the pistol powder. I was even more surprised then that he wasn't injured, and that the lower unit survived the little bomb that went off in the rifle's chamber. A costly lesson such as this is a hard way to learn to verify that the powder measure is empty before beginning another loading session.

Getting back to the disassembly, pull the charging handle back a short way, and then pull the bolt carrier and bolt out of the receiver. The charging handle will then drop down slightly and can then be pulled from the receiver. On the left rear side of the bolt carrier, you'll find the looped end of the firing-pin retaining pin. This pin can be pulled straight out of the carrier with a small flat-blade screwdriver tip. Once the retaining pin is removed, the firing pin will drop out of the rear end of the bolt. You'll see that the two legs of the firing-pin retaining pin are flared slightly outward. They're designed to be this way, so don't pinch the legs together or bend them outward any further.

Pushing the bolt head rearward will rotate the cam pin toward the left side of the carrier key. Rotate the cam pin so that its longer length runs parallel with the bolt carrier and then lift it up and out of place. The bolt should now slide out the front end of the bolt carrier. You should be able to feel some drag as the bolt is pulled forward from the bolt carrier. This is a good thing and means that the three gas rings in the bolt are doing the job



Above left: *The single, wider McFarland gas ring from Competition Specialties (641-342-2011) will eliminate any misalignment issues.* ***Above right:*** *The D-Fender D-ring is good insurance against ineffective extraction.*

they were intended to do. If the bolt slides out of the carrier with no resistance whatsoever, it's time to replace the gas rings.

To remove the extractor, push out the pin holding it in place with a 3/32-inch punch. The extractor has a short spring and a tiny rubber insert, usually blue or black in color, that fits inside the spring. If the rifle develops sluggish extraction, it will help to install a D-Fender D-ring from MG Industries, Inc. (207/945-5441) over the extractor spring. This will help to give more positive extraction, which can sometimes be a weakness with these rifles.

Inspect the three gas rings at the back end of the bolt for any damage. Soak these in a good solvent and then give them a scrubbing with an old toothbrush or an M16-style brush to remove any carbon buildup. Give the ejector a couple of pushes with a punch to see that there is no hesitation with this component's action. If the ejector movement feels gritty, you'll need to drift out the pin holding it in place and clean its receptacle with solvent and insert a few drops of lube. Yes, I know that the military manuals say that this pin can be removed with the firing-pin tip, but save that procedure for emergency situations. My advice is to use the punch instead to avoid any unnecessary damage to the firing-pin tip. Clean the bolt face with a carbon-removing solvent and then wipe the entire bolt down with Break-Free CLP.

Before reinstalling the bolt into the carrier, make sure the three gas rings are rotated such that none of the gaps in the rings line up with another gap. If the gaps in these rings are rotated to around 120 degrees from one another, there will be no problem with gas blow-by and the bolt will function correctly. Some folks say that it doesn't matter how the gas rings are oriented, but it certainly does no harm to stagger the gaps.

Check the carrier key for any looseness. If found to be loose, tighten the two screws that hold the carrier key to the carrier. These screws can be held in place with a thread-locker, but they must also be staked in place with a center punch to prevent any rotation of the screws caused by vibration from the firing sequence.

Now insert the bolt back into the carrier, making sure that the extractor is to the right side of the carrier and the cam-pin hole in the bolt is aligned with the cam-pin hole in the carrier. Insert the cam pin and push it down and then rotate it so that the longer length runs perpendicular to the carrier. Pulling the bolt forward will rotate the cam pin up and underneath the carrier key. Insert the firing pin and then the firing-pin retaining pin with the loop positioned up/down in relation to the carrier, making sure that the flared legs of the retaining pin go behind the shoulder of the firing pin in front of the rear head of the firing pin.

There are four raised rails along the carrier that will need some lube before being reinstalled into the receiver. I prefer to smear a light coat of Gunslick or Lubriplate grease here, but whatever lube you prefer will probably do just as well. The important thing is you don't want to run the bolt carrier dry in these areas.

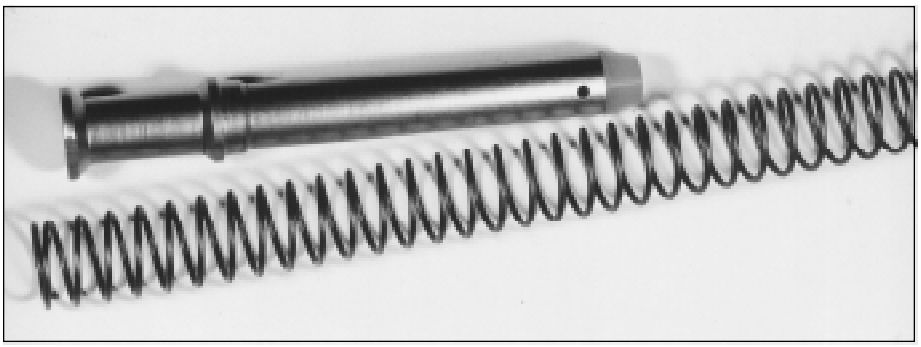
This rifle has a flat-top receiver designed for mounting a scope, but the charging handle will usually need to be adapted for easy access under the eyepiece of the scope. Badger Ordnance (816/421-4956) offers a tactical charging-handle latch that gives much easier access once a scope is mounted. To change to the tactical latch, simply drive out the retaining pin, insert the original latch spring, the new latch handle, and then reinsert the retaining pin.

Most of these rifles have a chrome lining in the barrel, which will just about double the life span. Even though the barrel is treated with this tough plating, a chamber guide of some sort will protect the throat/leade area when running a cleaning rod down the bore.

Lower Assembly Maintenance

The lower unit contains the trigger assembly and the buffer system, which absorbs recoil energy and returns the bolt carrier into battery. On this particular rifle, the trigger is of the single-

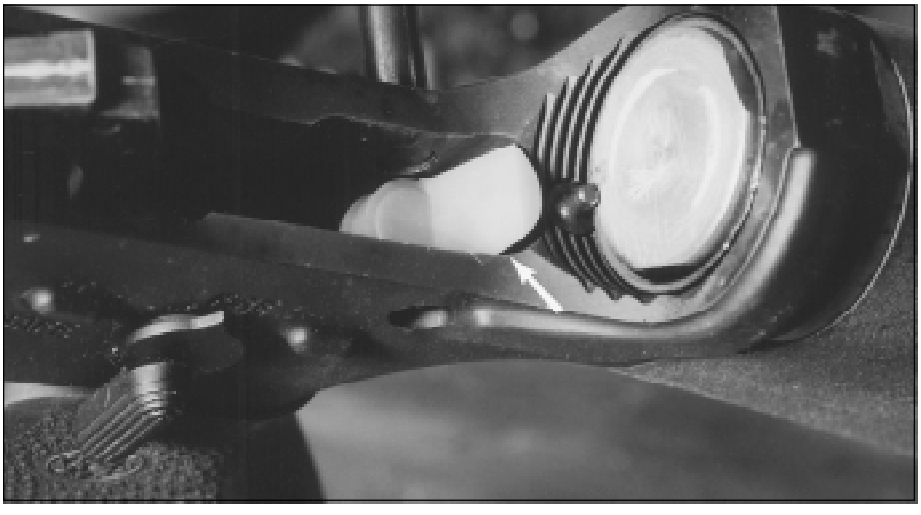
Right: *A light coating of grease along the outer edges of the buffer spring will eliminate the scraping sound caused by the steel spring inside the aluminum buffer tube.*



stage type and is a very simple, efficient system. A dab of lubricating grease on all the pivoting points as well as the hammer- and sear-engagement notches is sufficient to keep these areas working smoothly.

When you purchase a complete rifle assembly, you'll usually find that the lower-to-upper-unit fit is quite tight. But a slight wobble is often found between the upper and lower assemblies when a different upper is attached to the lower assembly. To help tighten the fit and eliminate any slight looseness between these units, you might want to consider the installation of an ACCU-Wedge from Buffer Technologies (877/628-3337). This small piece of pliable material has an angular top section that will tighten up the fit of the upper to lower unit. If after installing the ACCU-Wedge you find that it's difficult to get the rear takedown pin through the upper and lower units, you can remove a bit of material from the bottom of the ACCU-Wedge and keep trying the fit of the two units until the takedown pin goes through and the looseness is gone.

Below: *The ACCU-Wedge provides an easy fix to the problem of looseness between the upper and lower units.*



At the inside back face of the receiver, you'll see where the front face of the recoil-spring buffer sits. The recoil buffer and spring are captured inside an aluminum tube that resides inside the buttstock of these rifles. During the firing sequence, the steel recoil spring is compressed inside this tube and creates a scraping sound that is annoying to some folks. The remedy to eliminate the scraping sound is quite simple. First, remove the buffer assembly and action spring, and rotate the buffer assembly so that one of the three flats on the outside diameter of the buffer is behind the detent pin in the bottom of the threads in the rear of the receiver. Depress the detent with a small flat-blade screwdriver tip, and allow the buffer assembly to ease forward until you have the assembly and action spring completely out of the receiver extension tube. Once the buffer assembly is out, it's a good idea to examine the nylon insert attached at the rear end of the buffer for any damage. Replace it if necessary. Remove the action spring from the buffer and rub some Lubriplate grease along the outside diameter of the spring. This will help eliminate the hollow, scraping sound that's heard when the spring retracts and goes forward during the firing sequence.

A note of caution here: If an AR-15-type rifle contains just one M16 part, the rifle is considered a "machine gun" by the BATF, and you and the owner can get in some very hot water if this is ever discovered. If you find M16 parts inside the receiver or trigger group, remove them and install the correct parts to avoid any legal issues.

Conclusions

As military small arms evolve and become more sophisticated and incorporate things like mortar tubes and rocket launchers, we may well find that the AR-15-type is the last civilian version of a military rifle that's available to the public. As things stand now, anyone who can legally purchase any rifle can buy an AR-15 or one of the numerous clones, and anyone can purchase all the parts for an AR-15-type clone, except one—the lower receiver. (This part is serial numbered and considered to be a firearm by the BATF, and all the legal ramifications involved with the purchase of any firearm apply.) The result of all this is that gunsmiths are likely to see all manner of basket-case ARs and amateur-assembled rifles come through the door. Troubleshooting and assembling these "rifles" can provide lots of work for anyone familiar with the type. ■