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In-Depth Explanation of Firearms and Ammunition

This is online Chapter 15 of the second edition of the law school textbook Firearms Law and the Second Amendment: Regulation, Rights, and Policy (2d ed. 2017). The printed book, by Nicholas J. Johnson, David B. Kopel, George A. Mocsary, and Michael P. O'Shea, consists of Chapters 1 through 11. More information and additional materials are available at <https://www.wklegaledu.com/johnson-firearms-law-2>. The printed book may also be purchased from Amazon.com and Barnes & Noble (bn.com). The companion website for the book is firearmsregulation.org.

The online chapters, by Nicholas J. Johnson, David B. Kopel, George A. Mocsary, and E. Gregory Wallace, are available at no charge from either <https://www.wklegaledu.com/johnson-firearms-law-2> or from the book's separate website, firearmsregulation.org. They are:

- 12. Firearms Policy and Status. Including race, gender, age, disability, and sexual orientation.*
- 13. International Law. Global and regional treaties, self-defense in classical international law, modern human rights issues.*
- 14. Comparative Law. National constitutions, comparative studies of arms issues, case studies of individual nations.*
- 15. In-Depth Explanation of Firearms and Ammunition. The different types of firearms and ammunition. How they work. Intended to be helpful for readers who have little or no prior experience, and to provide a brief overview of more complicated topics. (This chapter.)*
- 16. Antecedents of the Second Amendment. Self-defense and arms in global historical context. Confucianism, Taoism, Greece, Rome, Judaism, Christianity, European political philosophy.*

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Many aspects of gun policy are driven by the mechanics of firearms. Knowledge of how firearms and ammunition operate is thus essential to careful thinking about firearms law and the Second Amendment. People who learn, shape, and review laws should make every effort to understand basic facts about the operation and use of the firearms involved. Unfortunately, this does not happen in many instances. Consider, for example, the public debate over so-called assault weapons and large-capacity magazines. Here are a few examples of false or misleading claims about their functioning:

- Both a former [United States President](#) and the [head](#) of a prominent gun control advocacy group have described “assault weapons” as firing like machine guns. They confuse semi-automatic with fully automatic firearms.
- Two federal appellate courts have declared that the semi-automatic-only AR-15 rifle is a “weapon of war” made to be used on the battlefield. Yet no national military force actually uses semi-automatic-only rifles in combat.
- Another federal appellate court described “assault weapons” as being “[designed to spray fire rather than to be aimed carefully](#).” Multiple courts have asserted that pistol grips on AR-15 rifles are designed for spray-firing from the hip. The assertion is false. AR-15s, like all so-called assault weapons, are intended to be aimed. “Shooting from the hip” is a disparaging term used to describe the reckless act of discharging a firearm without aiming. These judges lacked rudimentary knowledge about the function of such firearms.
- A congressman [declared](#) after the Orlando nightclub shooting that semi-automatic-only AR-15 rifles fire “700 rounds a minute.” After the Parkland, Florida school shooting, a prominent Harvard law professor [tweeted](#) that the AR-15 rifle “easily fires over 10 rounds per second.” A semi-automatic rifle fires only one round with each pull of the trigger. The congressman and law professor were giving rates of fire for fully automatic weapons, not semi-automatic rifles like the AR-15.
- One congresswoman who was the prime sponsor of federal legislation to ban large-capacity magazines [explained](#) that the millions of such magazines already in circulation would be disposed of once the ammunition in them had been shot. She failed to understand that magazines can be reloaded and reused.
- Another congresswoman who had sponsored federal legislation banning “assault weapons” with certain features like “barrel shrouds” was asked in a media [interview](#) whether she knew what a barrel shroud is. She admitted, “I actually don’t know what a barrel shroud is. I believe it’s that shoulder thing that goes up.” Barrel shrouds (or handguards) cover the barrel on an AR-15-type rifle.
- Still another congresswoman who had introduced gun control legislation [stated](#) that she has “[held an AR-15 in my hand](#)” and [that it is “as heavy as 10 boxes that you might be moving”](#) and fires a .50 caliber bullet. The AR-15 rifle ordinarily weighs 6-8 pounds unloaded and most commonly fires a .223 caliber bullet.
- A former Vice-President [advised](#) his radio listeners to buy a double-barreled shotgun for self-defense rather than an AR-15 rifle because the AR-15 is “harder to aim” and “harder to use.” In another [interview](#), he advised keeping intruders away from one’s house by “fir[ing] the

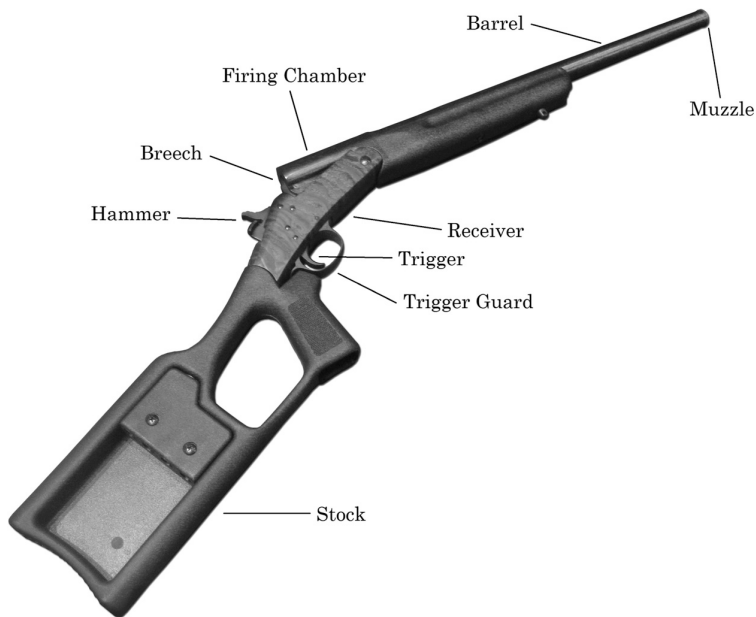
shotgun through the door.” The AR-15 actually is easier to handle and aim and has much less recoil than a shotgun, and firing a shotgun through an entrance door is unlawful in many circumstances, especially if the shooter cannot see who’s on the other side.

This chapter is designed to help the reader understand the basics of how firearms and ammunition function. Part A presents the basic parts of a firearm with summary diagrams. Part B describes the various components of firearm ammunition—the bullet, case, primer, and gunpowder. Part C discusses the operation and safe handling of modern firearms. Part D focuses on the three major types of modern firearms—handguns, rifles, and shotguns—explaining their specific features and uses. Part E examines specialty types of firearms and accessories, including those covered by the National Firearms Act (machine guns, bump-stocks, and silencers or suppressors), as well as muzzleloaders and armor-piercing ammunition. Part F covers nonfirearm arms such as stun guns, edged weapons, air and paintball guns, bows, chemical sprays, and blunt weapons.

In the printed textbook, the history and effects of developments in firearms and ammunition technology are covered in Chapters 2.I, 3.D.2, 4.E, 5.C, 6.F, and 7.C.

A. Introduction to the Parts of a Firearm

A firearm uses the energy created by ignition of a chemical compound (gunpowder) to launch one or more projectiles out of a metal tube called a barrel. Consider a simple firearm, a single-shot rifle:

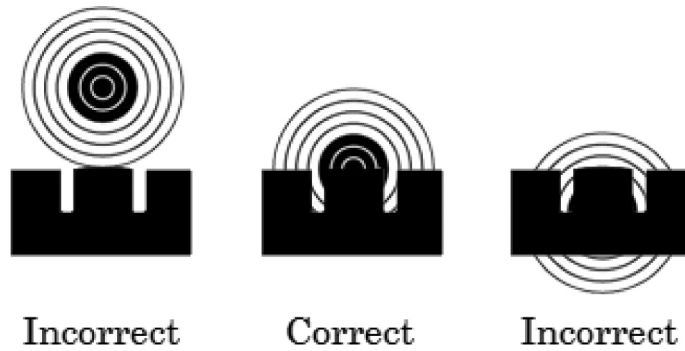


Single-shot rifle, with breech open.

The major parts of a firearm are labeled in the diagram. The firearm is fired by pressing the *trigger* with a finger. The trigger is linked to a spring-loaded *hammer*. Once the trigger is pressed, the hammer is released and pulled forward by the spring. On the front of the hammer is the *firing pin*. When the hammer springs all the way forward, the firing pin strikes the *ammunition cartridge*, which is held in the gun's *firing chamber*. The impact of the firing pin ignites the gunpowder in the cartridge (as explained further below), and the gun fires.

The cartridge consists of a metal *casing*, a *primer* (which is ignited by the blow from the firing pin), *gunpowder* (which is ignited by the primer), and a bullet—a conical or cylindrical projectile. The ignition of the gunpowder causes an expansion of gases that propels the *bullet* down the *barrel* and causes the bullet to fly at high speed out the barrel's open end, the *muzzle*, which has been aimed at the target.

When firing the rifle, the shooter braces its *stock* against the shoulder of the same arm she uses to operate the trigger. By lining up the *sights* that are attached to the top of the rifle, the shooter can aim the rifle accurately, controlling where the bullet will strike when the gun is fired.



Incorrect and correct sight alignments for an open notch-and-post sight (typically used on handguns, but also available for rifles). The tops of the three posts must form a line through the point of aim. In the left image, the bullet will strike the target below the point of aim. In the center image, it will strike the bullseye. In the right image, it will strike above the point of aim.

Almost all the moving parts of a gun are housed in its *receiver*, which is a metal frame that surrounds the firing chamber and connects it to the barrel. The receiver contains the *action* of the gun, which is the group of moving parts that allow the gun to be loaded, fired, and unloaded. Once the bullet has been fired, the empty casing is left behind in the firing chamber. To reload the gun, the user opens the action, manually removes the empty casing from the firing chamber, and inserts a fresh cartridge in order to fire again. The cartridge is inserted at the *breech*, the opening at the rear of the barrel.

The rifle just described is simple in its functions. As explained below, most modern firearms have additional features that give them greater firing capability than the basic single-shot rifle, while also making them more complex. Most of these features relate to the gun's use of ammunition. The vast majority

of modern firearms are *repeaters*: they can be fired more than one time before manual reloading. They have various mechanisms that allow fired cartridges to be ejected, and fresh cartridges to be moved into the firing chamber, rather than requiring the user to open up the gun and replace each fired cartridge by hand. In order to understand these features, a brief discussion of ammunition and how it works is appropriate.

B. Ammunition

Modern rifles and handguns use *metallic cartridges*. That is, the casing is made of metal, rather than paper or some other substance. A single unit of ammunition is called a *cartridge* or a *round*. (As explained below, shotgun ammunition is different from rifle or handgun ammunition. A single unit of shotgun ammunition typically is called a *shell*, but it also may be called a cartridge or round.)

Approximately 4 billion cartridges are produced commercially in the United States each year. Although a serious competitive shooter may fire tens of thousands of rounds of ammunition every year in practice and competition, most gun owners use ammunition at a much lower rate.

Ammunition typically is sold at retail in the United States in boxes of 20 to 100 cartridges, as well as in cases of 500 or 1,000 cartridges. It can be purchased at gun stores, sporting goods stores, large retail stores, and gun shows. A large volume of ammunition also is sold and shipped by Internet and mail-order sellers.



On the left, a rifle bullet. On the right, a complete cartridge (or “round”), containing the bullet. The brass casing holds the bullet and (underneath the bullet) the gunpowder. The primer is in the bottom center of case; like the gunpowder, the primer is not visible in this photo. The upper part of the case is tapered; this is common for rifle cartridges, much less so for handgun cartridges. The lead bullet is covered with copper alloy jacket. The jacketing improves performance and reduces lead fouling in the gun.

Like firearms manufacturers, individuals or companies that manufacture small arms ammunition for sale must obtain a Federal Firearms License (FFL) from the federal Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF). No federal license is required to manufacture a firearm or ammunition solely for personal use. A person who sells firearms manufactured by someone else needs an FFL; a person who only sells ammunition manufactured by someone else does not. For more information, see <https://www.atf.gov/qa-category/manufacturers> and <https://www.atf.gov/firearms/qa/license-required-engage-business-selling-small-arms-ammunition>.

The ammunition cartridge has four major components: the *bullet*, the *case*, the *primer*, and the *gunpowder*.

1. Bullet

Bullets are typically metal projectiles. Some people use the word “bullet” casually to refer to a complete ammunition cartridge (“there were no bullets in the gun”), but such language is imprecise and can lead to misunderstandings. Properly speaking, one loads a gun with *cartridges* or *rounds*, not with bullets. A bullet is simply one part of a cartridge—the metal projectile, inert in itself, that is launched at high speed from the gun upon firing.

Bullets differ in their material composition, but most are composed of lead alloy. They are often coated with a thin jacket of copper or brass. Some bullets are made of metals other than lead, such as copper, steel, and tungsten. (See *infra* Section D.5 for information on armor-piercing ammunition.)

Different shapes or types of bullets are used in ammunition intended for different purposes. For example, the most common handgun bullet shape is a *round nose*, which has good aerodynamics but is not the most effective at transferring kinetic energy to a target. *Flat-nosed* bullets, also called *wadcutter*s, are traditional for some types of target shooting because they cut a clean, round hole in a paper target that makes keeping score easy. Some shooters use *semi-wadcutter* bullets, which have a partially flattened nose that increases the bullet’s striking power, but with more aerodynamic stability.



Cartridges loaded with different bullet shapes. From left to right, round-nose, hollow-point, and wadcutter bullets.

The most common type of handgun bullet for civilian self-defense, hunting, and law enforcement use is the *hollow point*. Such a bullet has a hollow cavity in the tip that causes the bullet to flatten and expand when it strikes a target. This makes the bullet more effective at incapacitating a human adversary or game animal because it increases the amount of tissue damage caused by the bullet. It also reduces the risk of *overpenetration* that endangers bystanders. The hollow-point bullet is more likely to expend all its energy in its target and come to rest there, instead of piercing through the target and emerging from the other side, still traveling at a dangerous velocity.



When bullets hit their targets, the soft lead deforms. The high-performance, expensive bullet on the left has “opened up” almost perfectly.

Hollow-point rifle ammunition is also popular for self-defense and for hunting small to medium game. A few jurisdictions prohibit the use of hollow-point ammunition for self-defense. See N.J. Stat. Ann. §§ 2C:39-3f(1), :39-3g(2), :39-6f (prohibiting individuals from possessing hollow-point ammunition, except on their own property, when hunting, target shooting, or traveling to and from a target range, or when the hollow cavity has a polymer filling).

Despite widespread use by law enforcement and civilian populations, hollow-point rounds typically are not used by the military. The Hague Convention of 1899 banned the use of hollow-point ammunition in international warfare. While the United States was not a signatory to the Convention, it generally follows this practice. For more background on the legal and operational implications of modern military use of hollow-point ammunition, see Christian Beekman, [Why the US Military Should Switch to Hollow-Points](#), Task & Purpose, Jan. 8, 2015.

The military typically uses *full metal jacket* ammunition. This ammunition uses soft-core pointed or round-nosed bullet (typically lead) surrounded by a casing of harder metal (typically copper). Because the harder coating resists deformation, the round is less prone to jams when fed into the chamber for firing. Cartridges with full metal jacket bullets also are popular for practice shooting by civilians as well. The copper coating reduces the lead residue (which can impede accuracy) in the barrel when the gun is fired. Because the jacket keeps the bullet from expanding, the ammunition penetrates more deeply into a target, producing a narrower wound channel and increasing the risk of overpenetration and damage to an unintended target. Some military rounds are designed break into fragments when they strike a target, which can increase wounding potential.

Soft point ammunition is often used by rifle hunters. It is simply a jacketed bullet with an exposed, nonjacketed lead tip. It strikes a balance between full metal jacket and hollow-point ammunition, expanding more on impact than the former but penetrating more than the latter.

Some bullets are made of rubber. They are nonlethal, intended to hurt, bruise, and disorient a target. They are often used by law enforcement for crowd control and to deter further action. In most cases, the efficacy of rubber bullets depends on their deterrence effect because they are insufficient to incapacitate a target.

2. Case

The components of a cartridge are held together by a hollow *case* of brass, aluminum, or steel. After a shot is fired, the empty case remains. Repeating firearms use a mechanical protrusion called an *ejector* to remove the spent case from the gun's firing chamber in order to make room for a fresh cartridge. Handgun ammunition cases are usually *straight-walled*, while rifle ammunition often uses *bottlenecked* cases whose tapered shape allows large powder charges to be used and improves the loading of fresh ammunition from a magazine (see below).

A brass case recovered after firing can usually be reused. After the case is cleaned, it can be refilled with gunpowder, a primer, and a bullet to create another cartridge. This process of recycling is called *hand loading* or *reloading*.¹ Many gun owners reload their own ammunition at home, using tools that are created for this purpose. Competitive target shooters reload for more precise bullet control as well as out of economic necessity, as they typically fire thousands of rounds per month in practice. Some hunters reload in order to produce a small number of high-quality rounds precisely tailored to particular conditions. Other reloaders simply enjoy making things.

The bottom surface (or *head*) of the case will usually be marked with the name of the cartridge it fires (called the *headstamp*). For safety, it is essential that a gun only be loaded with a matching cartridge. The appropriate cartridge type will be stamped on the barrel or receiver.

A firearm's caliber is essentially a measure of the diameter of the barrel and bullet that it accepts. Within a single caliber, different types of ammunition may have widely varying loads of gunpowder. For example, by far the most common type of ammunition in the United States is .22LR. (The "LR" stands for "long rifle," but the .22LR round is used in both rifles and handguns.) Other types of .22 caliber ammunition include the .22 Long, .22 Short, .22 Spitfire, and the .22 Winchester Magnum Rimfire (also called .22 WMR, .22 Magnum, or .22 Mag). The .22 WMR uses much more gunpowder than a .22LR. Accordingly, if a firearm has ".22LR" stamped on its barrel, and no other caliber/type stamp, one

1. Thus "reloading" has two meanings. One meaning is the manufacture of a new cartridge from a used case. The other meaning is the placement of a fresh cartridge in the firing chamber after the gun has been fired.

must not use, for example, .22WMR in that gun. The extra gunpowder could expose the firing chamber to pressures for which it was not designed, thereby causing a dangerous explosion.

The same is true for the popular AR-15 type rifle, which typically is chambered for .223 Remington (Rem.) or 5.56 NATO ammunition. The 5.56 NATO, measured in millimeters, is a standard caliber designation for military rifles used by NATO countries. Both rounds look identical, but the .223 Rem. cartridge has a lower pressure than the 5.56 NATO. While it is safe to shoot .223 Rem. ammunition in a 5.56 NATO caliber rifle, it is *unsafe* to fire a 5.56 NATO round in a .223 Rem. caliber rifle (the only exception is a [.223 Wylde](#) rifle). The pressures of a 5.56 NATO cartridge are too high for the .223 Rem. chamber and can result in a dangerous pressure spike that can damage the firearm and cause serious injury to the person using it.

If you ever have doubts about a cartridge's suitability for a particular firearm, do not fire the cartridge, and wait until you can ask a reliable source. As the following figure illustrates, each of these cartridges is more powerful than the one following it.



Different types of ammunition. From left to right, .223 Remington, .22 WMR, and .22 LR. Note that the bullet (the top part) for the .223 Remington is only 3/1000 of an inch wider than the .22 caliber bullets. But the .223 Remington's case is much wider and larger, allowing more room for gun powder, making it far more powerful than the other two.

3. Primer

The primer has often been described as the spark plug of the cartridge. When a gun is loaded with a cartridge and the hammer falls, the gun's firing pin sharply strikes the primer. The blow causes a pressure-sensitive chemical compound in the primer to ignite and emit an instantaneous hot flash. The flash then ignites the gunpowder inside the case. The gunpowder burns in a fraction of a second, releasing expanding hot gases, whose pressure pushes the bullet free from the case, and launches the bullet down the barrel.

Cartridges are primed in two different ways. *Centerfire priming* is used for all modern cartridges larger than .22 caliber (as well as some smaller caliber cartridges, such as some .17 calibers). In this system, the priming compound is enclosed inside a thin metal casing to form a *primer cup*. The cup, in turn, fits into a hollow pocket in the center of the bottom face of the cartridge. Thus, a primer is in line with the firing pin when a cartridge is loaded into the gun's firing chamber. When the gun's trigger is pressed, the firing pin sharply strikes the primer and compresses the priming compound, detonating it. The primer's flash passes through a *flash hole* between the primer cup and the cartridge case and ignites the gunpowder there.

The older system of *rimfire priming* does not use a separate primer cap. Instead, priming compound is applied directly to the inside of the bottom of the cartridge case, inside a cavity in the cartridge rim. The firing pin of a rimfire gun does not strike the rear of the cartridge in the center, but instead on the edge of the rim (hence the name). Again, once the firing pin impacts the primer, the priming compound detonates, and in turn ignites the gunpowder, firing the round. Unlike centerfire cartridge cases, rimfire cartridge cases are not reloadable.



Rimfire vs. centerfire cartridges. At left is a .22 Long Rifle round, a rimfire cartridge. At right is a .38 Smith & Wesson round, a centerfire cartridge, seen from below. Note the telltale, circular primer cup that sits at the bottom of the centerfire cartridge's case head. The rimfire cartridge lacks this. Instead, it has a layer of priming compound (not visible) applied to the inside of the brass rim of the cartridge.

Rimfire priming is still used for some small cartridges, including the extremely common .22 Long Rifle cartridge, introduced in 1887. Despite its name, the .22 Long Rifle is a small, inexpensive cartridge that is widely used in both handguns and rifles. It is the most popular cartridge in the world by a wide margin, used extensively for practice, small game hunting, and formal target shooting, including Olympic pistol and rifle shooting events. Approximately 2 billion rounds of .22 LR ammunition are manufactured each year in the United States. Some shooting events are divided into centerfire and rimfire divisions, corresponding to the division between the larger, more powerful centerfire cartridges and the smaller rimfires.

The most common chemical in priming compounds today is lead styphnate. Firing ammunition with lead styphnate-based primers emits minute particles of lead compounds into the surrounding air. In indoor shooting ranges, adequate ventilation is necessary in order to prevent these lead compounds from building up. Sustained indoor exposure without ventilation could create a risk of lead poisoning. Health and environmental concerns about conventional primers have led manufacturers to develop lead-free primers that do not emit compounds containing lead or other heavy metals. Ammunition with lead-free primers is commercially available, and is gaining in popularity, but still comprises only a minority of ammunition sold in the United States.

4. Gunpowder

A major innovation in firearms technology was the development in the 1880s of modern *smokeless gunpowder*, based on nitrocellulose and nitroglycerin. Before then, all firearms were powered by *black powder*, a mixture of saltpeter (potassium nitrate), charcoal, and sulfur.

Smokeless powder is much less volatile in storage than black powder.² Smokeless powder also burns more uniformly and consistently, produces less smoke, and delivers far more energy when ignited, combusting in thousandths of a second. Smokeless powder enabled the development of rifle ammunition that launches bullets at more than twice the speed of sound—a far greater velocity than had been possible with black powder. It also allows a shooter to deliver repeated fire from a single location, because his vision is not obscured by the thick clouds of smoke characteristic of black powder. Commercial ammunition today overwhelmingly uses smokeless powder.

Black powder is obsolete for most purposes, but is still used today by hobbyists and hunters, who often fire it in antique or replica firearms. For example, a hobbyist firing an exact replica of an old-fashioned flintlock rifle might use standard black powder. Modern uses of old-fashioned muzzle-loading guns are discussed below. Today, most people who shoot muzzleloaders use one of the many black powder substitutes, which are much less volatile, and produce less smoke, than traditional black powder. Smokeless powder and black powder

2. Old-fashioned black powder's volatility is the reason that, in colonial America and the Early Republic, large quantities of black powder were typically stored in a communal "powder house," made of brick. Chapter 3.C.1 describes the "powder alarms" that took place in 1774 when the British seized some of these American powder houses.

substitutes are nearly impossible to produce at home, while black powder is readily manufactured at home—as it frequently was before, during, and after the American Revolution.

For further information on ammunition, see the [Reference page](#) of the International Ammunition Association website. The site also has a very long bibliography of books on cartridges or ammunition. La Asociación Española de Coleccionistas de Cartuchería (AECC)³ provides a tremendous amount of graphical and Spanish-language textual information at <http://www.municion.org>.

C. *Firearm Operation and Safety*

Understanding firearm and ammunition basics is important to understanding how to operate firearms, and to do so safely.

1. **Firing Mechanism**

The *action* is the part of the firearm that loads, fires, and ejects the ammunition cartridge. Lever action, pump action, and bolt-action firearms require manual operation between rounds, while semi-automatic and automatic actions will eject the fired round and load the next one mechanically.

The firearm is fired by pressing the trigger. In a typical design, the trigger is connected to a mechanical linkage called a *sear*. Pressing the trigger moves the sear, which releases a spring-loaded hammer. When the hammer falls, its force causes the firing pin to strike the primer in the ammunition cartridge. Some modern firearms use a similar spring-loaded mechanism called a *striker*. Once the propellant in the cartridge is ignited, the bullet travels down the barrel and emerges from the firearm.

The barrel in a modern handgun or rifle is *rifled*. This means its inside surface has been cut with a pattern of spiral grooves that cause the bullet to spin around its long axis as it travels through the barrel. The rotation, like the spin on a properly thrown football, makes the bullet fly in a straighter path when it emerges from the muzzle.

2. **Magazine**

Most modern firearms are *repeating arms*, or *repeaters*: they can be fired multiple times before it is necessary to manually insert more ammunition into the gun. A repeater is not the same as a “machine gun” or an “automatic” firearm (discussed below). The mechanism where a repeating arm stores its ammunition,

3. “Spanish Association of Cartridge Collectors.”

and from which ammunition is fed during use, is called a *magazine*. With some guns, the magazine is a hollow compartment or tube that is permanently attached to the gun. The *tubular magazine* is common in shotguns and *lever-action* rifles (discussed below).

Other guns, especially semi-automatic and fully automatic firearms, use *detachable magazines*, which are rectangular, parallelogram, or curved boxes that can be filled with ammunition, temporarily attached to the gun during use, and then removed when empty and replaced with a freshly loaded magazine, allowing continued firing. Detachable magazines can be reloaded and reused multiple times until their internal springs lose proper tension.

Another common device for storing several rounds in a firearm is the *revolving cylinder* of a *revolver* handgun, discussed below.



Detachable magazines for semi-automatic firearms.

3. Safety Devices

A modern firearm will only fire when the trigger is pressed. Older firearms also were designed to fire only when the trigger was pressed, but they lacked many of the safety features detailed below. If the gun fires under any other circumstance (e.g., if the gun is dropped), the gun is defective, and would be the target of a product liability lawsuit. Product liability suits have driven many such defective firearms out of the market. *See* Chapter 8.D (discussing product liability and other lawsuits against firearms manufacturers).

The most elementary safety device, found on nearly all modern firearms, is the *trigger guard*. The trigger guard protects the trigger from accidental motion, such as when a gun is being pulled out of a holster. The trigger guard also makes it easier for the gun user to obey one of the fundamental rules of gun safety: “Keep your finger off the trigger until you are ready to shoot.” (The safety rules are discussed in the next Section.)



Trigger guard.

For firearms design and firearms user training, a key principle is redundancy. So even though keeping one's finger outside the trigger guard is excellent protection against accidental discharge (unless the firearm is defective), modern firearms typically include additional safety features.

The most common of these is called the *safety*. The safety blocks the trigger or hammer from moving. The safety is typically activated by pressing a button, small slide, or lever that is located near the trigger.



Button safety.



Lever safety.

When the safety is in the “safe” position, the gun will not fire even when the trigger is pressed. To fire the gun, the user must move the safety to the “fire” position.

Virtually all modern rifles, shotguns, and semi-automatic handguns have external safeties. (Glock and some other semi-automatic handguns have a different type of safety, and revolver handguns do not have safeties, as explained in the discussion on handguns below.)

The safety devices discussed so far are intended to be operated while the gun is being used. For example, a bird hunter carrying a shotgun would keep the safety engaged while walking through a field, to reduce the chance of an accidental discharge if he stumbles or if his hand slips. When he needs to fire, he can quickly push the safety to the “fire” position.

An entirely different class of safety devices is employed when the gun is *not* being used. The purpose of these devices is to prevent use by an unauthorized user. The most obvious of these is a gun safe. Many gun owners store several firearms in a large safe. There also are smaller safes that hold one or two handguns. Alternatively, guns may be stored in a securely locked room.

Likewise, there are devices that can be attached to the gun itself to prevent unauthorized use. One of the simplest is a *trigger lock*, which wraps around the trigger guard, and (depending on the design of the lock and of the gun) keeps the trigger from being touched or from moving when touched.

The *cable lock* threads through the action, and sometimes also through the barrel. It prevents the action from completing its movement, thereby rendering the gun inoperable. Trigger locks and cable locks are typically unlocked with keys, although some use combination locks.



Cable lock on Heckler & Koch semi-automatic rifle.

Recently, some manufacturers have begun building firearms in which a key-controlled locking mechanism is built into the gun itself.



North American Arms offers an optional integral locking system on its semi-automatic pistols.

Since the 1990s, some researchers have been investigating more sophisticated integral locking mechanisms, such as palm-print readers built into the grip of a handgun. Firearms equipped with such devices sometimes are called *smart guns*. Thus far, no smart gun technology is sufficiently reliable to be commercially viable. Even a 1-percent failure or delay rate would not be acceptable to anyone who uses a firearm for self-defense or, for that matter, to a hunter who may have a two-second window of opportunity for the right shot. For this reason, law enforcement does not use smart guns, and its members actively resist attempts to require them to do so.

Locking devices can be defeated. A trigger lock can be smashed with a hammer, a cable lock can be cut, a safe can be broken open, and the mini-computer in a smart gun can be destroyed by heating the gun in an oven.

All of the locking devices involve trade-offs. A gun that is locked is more secure from an unauthorized user but much slower to deploy in a sudden emergency, such as a home invasion. Whether to use locks and what kinds of locks to use depend on individual circumstances and on whether the gun is intended to be available for self-defense. Finally, trigger locks are not infallible—with some low-quality trigger locks, the gun can be fired anyway.

4. Rules for Safe Firearm Operation

Firearms safety education stresses the importance of careful adherence to gun-handling rules to avoid accidents. While the user must know how to operate mechanical safety devices, safety training emphasizes that reliance on mechanical devices is never a substitute for rigorously following all safety rules.

Four basic rules of gun safety are commonly emphasized:

1. *Treat every gun as if it is loaded.* Never assume a gun is unloaded, safetied, or otherwise inoperable when handling it. Many firearm accidents—typically called “negligent discharges”—occur because the user mistakenly believes the gun is not ready to fire. The user may wrongly think

that the gun is empty when there is a round in the chamber, that the safety is on when it really is off, or that the gun is in good condition mechanically when it is ready to malfunction. Additionally, never rely on someone else's assurance the gun is unloaded—always check it yourself. Even if you are certain that a gun is unloaded, you must still obey all other safety rules.

2. *Always point the gun in a safe direction.* This is the practice of *muzzle discipline*, referring to the end of the gun's barrel that is pointed toward the target. This rule means that under no circumstances should a gun ever be pointed at any person, unless the gun is being used for lawful self-defense. Playfully pointing a gun at other people violates this rule. Never point the gun at anything you do not intend to shoot.
3. *Keep your finger off the trigger and out of the trigger guard until you are ready to shoot.* This is the practice of *trigger discipline*, and is critical to avoid unintentionally firing the gun. Movies and television promote irresponsible gun use by showing supposedly expert shooters violating trigger discipline. There is no reason *ever* to violate trigger discipline. Even when a gun is being drawn for instant self-defense, the proper motion is to keep the index finger outside the trigger guard until the sights are on the target. With proper training, trigger discipline does *not* delay a defensive shot by even a fraction of a second.
4. *Be sure of your target and what is beyond it.* This rule reduces the risk of harm to non-targets when the gun is intentionally fired. Such harm can occur if the shooter either misidentifies the intended target or misses the intended target and hits someone or something else around or beyond the target. To avoid misidentifying a target in home defense or other low-light areas, it is best for the shooter to have an attached or hand-held light. The shooter also must be aware what is beyond the intended target because the bullet may pass through the target and hit a non-target due to "overpenetration."

Firearm safety also requires use of two very important pieces of safety equipment. Whenever possible, the shooter should wear *safety glasses* and *ear protection*.



Safety glasses. Note the wrap-around design, protecting the eyes from flying debris at all angles.



Disposable foam earplugs provide hearing protection.



Ear muffs have always provided the best hearing protection. Today, electronic ear muffs are broadly affordable. The electronic speakers in muffs transmit human speech at normal levels; but when there is a sharp spike of sound—such as from a gunshot—the speakers shut down, instantly shielding the ear from the intense sound.

Anyone who wants to own a firearm should consider taking a firearms safety class. Indeed, even for a person who is certain that he or she will never own a firearm, safety education can be useful—just as people who do not like swimming or boating should still know the elementary rules of water safety.

Classes and other educational safety materials are available from the National Rifle Association (NRA), the National Shooting Sports Foundation (NSSF), the 4-H Clubs, some sheriff offices or police departments, gun clubs, and sporting-goods stores. Many have introductory classes that can be completed in an afternoon, as well as longer classes on particular topics such as pistol or rifle shooting.

State Fish & Game departments sponsor or offer hunter safety classes. Completion of the classes is necessary to obtain a hunter safety card, which typically is a prerequisite for getting a hunting license. The classes are fairly elaborate, often spanning multiple days, and cover a wide range of material, including firearm safety. [The International Hunter Education Association](#) and other groups offer online hunter safety classes, sometimes for free; classes include several modules on firearm operation and safety. To obtain a hunter safety card, many states require at least one in-person class session after the completion of an online class.

D. Types of Modern Firearms

Handguns, rifles, and shotguns make up the vast majority of privately owned firearms in the United States. According to the authors' estimates,⁴ there were approximately 170 million handguns, 123 million rifles, and 61 million shotguns in the United States in 2014, comprising about 47, 34, and 17 percent of the nation's gun stock. Other researchers estimate the totals at approximately 111 million handguns, 87 million rifles, and 53 million shotguns, comprising about 42, 33, and 20 percent of the total gun stock. Deborah Azrael et al., [The Stock and Flow of U.S. Firearms: Results from the 2015 National Firearms Survey](#), 3 Russell Sage Found. J. Soc. Sci. 38, 42 (2017) (estimating a total gun stock of 265,000,000).

Before discussing the various types of modern firearms, it is important to understand the difference between *semi-automatic* operation, which is found in many types of common pistols, rifles, and shotguns, and *automatic* (or, sometimes, *fully automatic*) operation, which is found in machine guns and heavier military weapons, and is subject to severe legal regulation.

A *semi-automatic* firearm fires only one round of ammunition with each press of the trigger. Each time the gun is fired, the semi-automatic action uses part of the energy from firing the cartridge to automatically eject the spent casing, re-cock the firing mechanism, and load a new cartridge into the firing chamber. For example, in a semi-automatic pistol, the energy of firing the gun causes the metal slide that forms the top of the pistol to cycle back and forth one time. The slide's motion backward causes the empty case to be ejected out of the side of the gun, and the slide's return forward brings the top cartridge in the magazine into the firing chamber, ready to be fired with another press of the trigger. Thus, the user of a semi-automatic firearm does not need to manipulate the gun by hand in order to load the next round. The gun loads itself. This is why semi-automatic guns are also referred to as *self-loading* or *auto-loading* guns.

By contrast, an *automatic* gun fires multiple times with a single press of the trigger. The mechanism of a fully automatic firearm works similarly to a

4. These estimates are based on (1) the gun-stock figures through 2014 in Chapter 1.B, and (2) the proportion of each type of firearm manufactured in, imported into, and exported out of the United States from 1995 through 2016 as measured by the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF).

semi-automatic gun, up to the point when the returning slide loads a fresh cartridge from the magazine into the firing chamber. From that point, the two types of actions behave very differently. A semi-automatic firearm simply loads the fresh round and stops: the trigger must be pressed again to fire the gun. An automatic firearm automatically strikes the freshly loaded cartridge with the firing pin, which fires the gun again and starts over the whole cycle of ejection and feeding described above, so long as the user keeps the trigger pressed and there is ammunition in the magazine. Once the trigger is pressed, the automatic gun will continue to fire until the trigger is released or all the ammunition is expended.

Some automatic firearms use *burst fire*, a mode in which they fire two or three rounds per trigger press, then stop until the trigger is released and pressed again. This difference, however, is not as important as the difference between semi-automatic action (one round per trigger press), on the one hand, and fully automatic or burst-fire actions, on the other.

Under federal law, any firearm that can fire more than one round per trigger press is deemed a *machine gun*. See Chapter 7 for the main federal law on the topic, [the National Firearms Act of 1934](#) (NFA). See Chapter 7.E.4 for *Staples v. United States*, 511 U.S. 600 (1994), which deals with the status of a malfunctioning semi-automatic rifle that sometimes fired two rounds with one trigger pull.

1. Handguns

The handgun is the most controversial broad type of firearm. Unlike long guns (rifles and shotguns), a handgun can be conveniently carried on one's person for long periods of time. Handguns are also more convenient to store than long guns, taking up little room inside a dwelling or vehicle. Most importantly, most handguns can be carried concealed from detection by others, whereas long guns are virtually impossible to carry concealed.

These traits make the handgun, in the words of the United States Supreme Court, the firearm that “is overwhelmingly chosen by American society for th[e] lawful purpose” of self-defense, and “the most preferred firearm in the nation to ‘keep’ and use for protection of one’s home and family.” *District of Columbia v. Heller*, 554 U.S. 570, 628-29 (2008) (Ch. 10.A) (invalidating a ban on handguns as a violation of the Second Amendment).

The handgun also epitomizes the crime gun. About 64 percent of all murders committed with firearms in the United States in 2017 were perpetrated with handguns. FBI crime report data shows that in 2017 a total of 10,982 murders were committed with firearms. Handguns were used in 7,032 of these murders, rifles in 403, shotguns in 264, and other guns in 187. For the remaining 3,096 murders, the firearm type was not identified.

The ATF's [Annual Firearms Manufacturing and Export Report](#) shows that in 2017 American manufacturers produced 3,691,010 pistols and 720,917 revolvers (the pistol/revolver distinction is explained below). Nearly 300,000 handguns were exported. The totals in the report do not include production for the United States military. More than 3.2 million handguns were imported

into the United States in 2017, according to the BATF's [Firearms Commerce in the United States Annual Statistical Update 2018](#). The leading exporters to the United States were Austria, Brazil, Germany, Croatia, and Italy.

a. *Semi-Automatic Pistols*

More than three-quarters of new handguns produced in the United States in recent years have been *semi-automatic pistols*, also frequently referred to simply as *pistols*.⁵ The vast majority of semi-automatic pistols feed their ammunition from a detachable magazine inserted into the gun's grip, although a few have magazines that are inserted elsewhere.

The use of detachable magazines makes reloading a semi-automatic pistol fast and simple. When the gun is empty, the slide locks back. The user can press a magazine release button or lever, causing the empty magazine to drop free. The user then can insert a fresh magazine into the *magazine well* and cycle the slide back (or depress a slide release button) to chamber a fresh round and continue firing.

The typical magazine capacity for today's full-sized semi-automatic pistols is 8 to 21 rounds, or more; compact or sub-compact pistols typically have fewer, sometimes as few as 6.

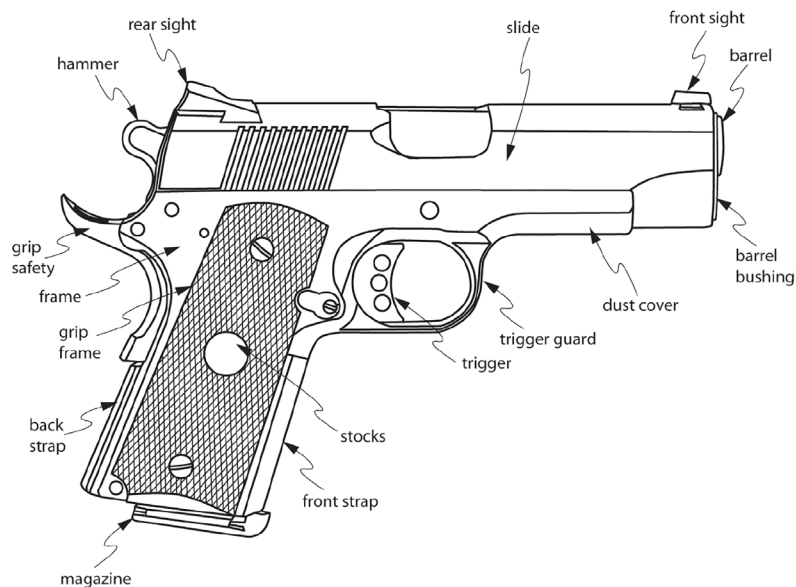
The ease of reloading and a larger magazine capacity have made semi-automatic pistols the dominant type of handgun used for military issue, law enforcement, self-defense, and many pistol competitions. The most common ammunition sizes for full-size semi-automatic pistols are the 9x19mm Parabelum (sometimes called the 9mm Para, 9mm Luger, or 9mm NATO), the .40 Smith & Wesson, and the .45 ACP.⁶ Small, lightweight pistols chambered in the .380 ACP cartridge have recently gained popularity for concealed carry. Many of these pistols weigh less than ten ounces and are no larger in size than a typical wallet. Finally, numerous semi-automatic pistols used for target shooting and recreation are chambered in the .22 Long Rifle (LR) cartridge. Some people choose compact .22 caliber handguns for concealed carry because of their small size. Persons with lesser upper-body strength may also choose a .22, of any size, for home defense, because of its light recoil.

5. Federal regulations define as a "pistol" any handgun that has a firing chamber that is "an integral part[] of, or permanently aligned with, the bore[]," in contrast to a "revolver," which is a handgun whose firing chambers are part of a rotating cylinder. [27 C.F.R. § 479.11](#). The vast majority of handguns classified as "pistols" under this definition are semi-automatics. However, there are a few types of specialty handguns, such as derringers and single-shot hunting handguns, that are also considered "pistols." ATF records indicate that these types of handguns represented less than 20,000 of the total output of pistols in 2008; the rest were semi-automatic pistols. In common parlance, "pistol" is often used to refer to all handguns, including revolvers. It is more precise, however, to distinguish pistols and revolvers, as the federal regulations do.

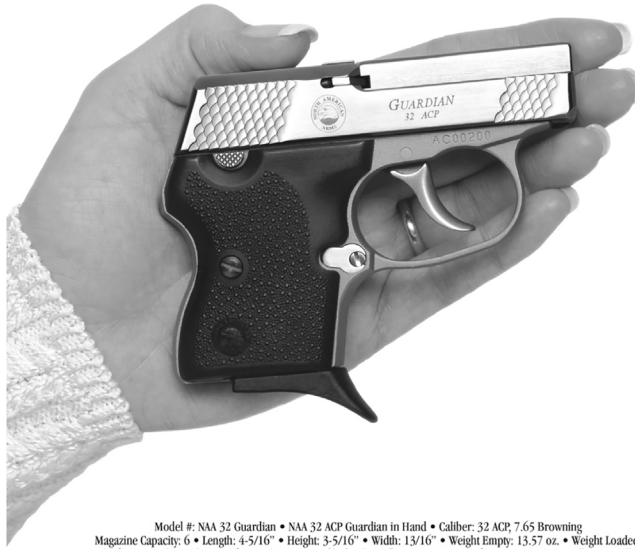
6. "ACP" stands for "Automatic Colt Pistol." Semi-automatic pistols are sometimes called "automatics," even though their action is semi-automatic, not automatic.



This .45 caliber semi-automatic centerfire pistol is made by Colt's Manufacturing. It is a "Model 1911," meaning that its design is based on the Colt .45 pistol invented in 1911. The 1911-type pistol has remained popular for over a century. Today, it is manufactured by many different companies, and remains one of the most popular pistols for self-defense and target shooting.



The major external parts of a semi-automatic handgun (a/k/a a pistol).



Model #: NAA 32 Guardian • NAA 32 ACP Guardian in Hand • Caliber: 32 ACP, 7.65 Browning
Magazine Capacity: 6 • Length: 4-5/16" • Height: 3-5/16" • Width: 13/16" • Weight Empty: 13.57 oz. • Weight Loaded:
14.86 oz. Barrel Length: 2-3/16" • Sights: Low profile fixed • Rifling: 1 in 15", RH, 6 Groove • Trigger Pull Avg.: 10 lbs.

This .32 caliber semi-automatic pistol from North American Arms is considered an “ultra-compact” because of its small size. If carried for protection, it would be put in a small holster, and the holster would be attached to the inside of a belt, or placed into a pocket or purse.

b. Revolvers



The two main types of revolvers. Left: Double-action revolver (Smith & Wesson Model 19). Right: Single-action revolver (Colt Single Action Army, colloquially known as the “Peacemaker”). An observer will note that on any single action, the trigger will be very close to the back of the trigger guard because the trigger pull has only to release the already cocked hammer, while on a double action the trigger pull must pull the hammer back.

The first commercially available *revolvers* were produced by Samuel Colt in the 1830s. They are still popular for many purposes. These handguns carry their ammunition in chambers cut into a revolving cylinder located behind the barrel of the gun. Working the gun's action rotates the cylinder, causing the next chamber to come into line with the barrel and hammer, allowing the user to fire the round loaded in that chamber. While revolvers of the twenty-first century take advantage of improvements in metallurgy, their basic design has changed little since the late nineteenth century.

Revolvers generally are simpler to load, operate, and unload than semi-automatic pistols. For many users, this simplicity, combined with their greater reliability, is an important feature. Some of the best-selling revolvers today are small, lightweight guns with short “snubnose” barrels, often used for concealed carry. Revolvers with especially long barrels are popular for target shooting or informal “plinking.” These can be chambered in the .22 Long Rifle rimfire cartridge or in centerfire calibers.

Revolvers often are preferred to semi-automatic pistols for hunting because revolvers can better accommodate the large powder charges necessary to fire a large bullet at hunting distances. Hunting revolvers are long barreled and bulky and generally weigh in excess of three pounds. They frequently are used with a mounted telescopic sight. Many hunters who carry a rifle or shotgun for hunting also carry a revolver as a sidearm for self-defense in case of an attack by a bear or other large predator.

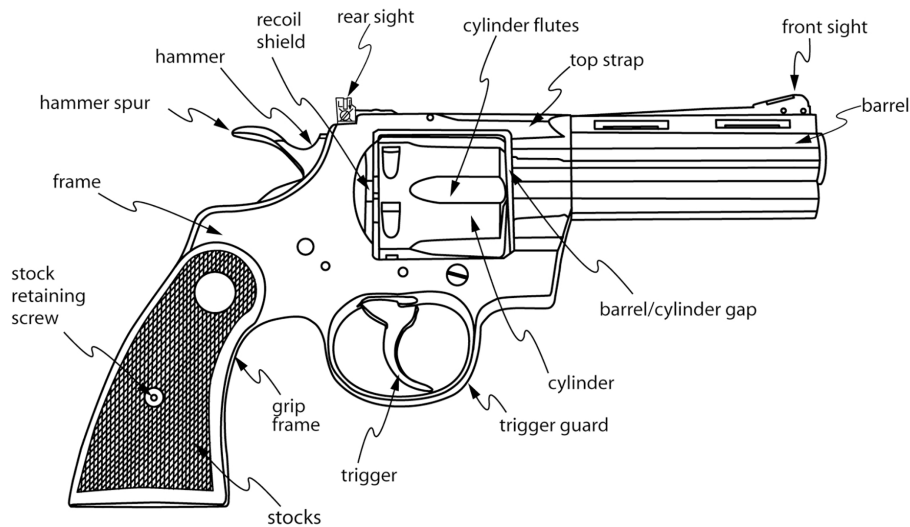
Revolvers were the most common handgun produced in the United States and the standard sidearm for police until the last part of the twentieth century, when semi-automatic handguns became more popular. Although semi-automatic pistols comprised only 28 percent of new handguns produced in the United States in 1973, semi-automatics today account for more than 75 percent of handguns produced domestically. Today, the large majority of police officers use semi-automatic pistols as sidearms. The most common brands include Glock, Smith & Wesson, and Sig Sauer.

Modern centerfire revolvers typically hold five or six rounds of ammunition, although some models hold more. Rimfire revolvers can hold ten or more rounds.

To remove empty shells from a revolver cylinder, the user presses an *ejector rod* on the front of the cylinder. The rod pushes the empty cases out the back of the cylinder.

The most common centerfire chamberings for revolvers are the .38 Special and the more powerful, high-velocity .357 Magnum, introduced in 1935.⁷ For hunting deer and larger game, popular revolver cartridges include .357 Magnum, .44 Magnum, and .500.

7. Revolvers chambered for the .357 Magnum can also chamber and fire .38 Special cartridges. The reverse is *not* true. A gun that has a “.38 Special” stamp on the barrel must never be loaded with .357 Magnum. “Magnum” is a term of art in cartridge manufacture indicating that the cartridge has a relatively large amount of gun powder for its caliber. Oenophiles may recognize “magnum” as the term for a double-sized bottle of champagne.



The major external parts of a revolver.

Revolvers divide into two categories according to how the action is operated.

i. Single-Action Revolvers

The first revolvers were *single-action revolvers*, such as the Colt Navy Model of 1851 and the famous Colt Single Action Army (“Peacemaker”) of 1873, popularized for modern audiences by Western movies and television programs. The user of a single-action revolver must cock the gun’s hammer by hand before firing each shot. Cocking the hammer rotates the cylinder and brings a fresh round under the hammer to be fired. Pressing the trigger simply drops the cocked hammer to fire the gun—a single action. Single-action revolvers are slower to load and unload than any other type of repeating handgun. Once all the cartridges are fired, the revolver is unloaded by using a rod to punch the fired cases free of the cylinder, one at a time, through the revolver’s loading gate. A revolver is usually reloaded through the same gate. A notable exception is the Schofield revolver, which is reloaded by releasing a latch that causes the top of the revolver to break open, ejecting the spent shells and allowing access to the entire empty cylinder.

Although obsolete for self-defense purposes, single-action revolvers remain in production, and are popular for recreational shooting and handgun hunting. Single-action revolvers are also required equipment for the sport of cowboy action shooting, in which participants dress up in historic American Western garb and shoot themed target courses with firearms of nineteenth-century design. See Abigail A. Kohn, [Shooters: Myths and Realities of America’s Gun Cultures](#) (2004).

ii. *Double-Action Revolvers*

Double-action revolvers date from the 1880s. Pressing the trigger of a double-action revolver performs two actions: it cocks the hammer back (thereby rotating the cylinder), then drops the hammer to fire the gun. To fire again, the user simply presses the trigger again. Cocking by hand is not necessary, although most double-action revolvers can also be manually cocked like a single-action. Most double-action revolvers have a latch or button that allows the whole cylinder of the handgun to swing out from the gun frame, so that the user can access all of the chambers in the cylinder at the same time. This makes double-action revolvers faster to load and unload than single-action revolvers, though still slower than semi-automatic pistols.

c. *Legitimate Uses of Handguns*

Handguns are commonly owned and used for home defense, concealed or open carry, recreational target shooting, competition, and hunting.

Handguns are more likely to be acquired for the purpose of self-defense than are long guns, such as rifles and shotguns. Surveys consistently report that the majority of handgun purchasers are motivated at least in part by personal protection. In the 2015 National Firearms Survey, 76 percent of handgun owners reported that they owned a handgun primarily for protection. See Deborah Azrael et al., *supra*, at 44.

Recent studies show that Americans hold at least 17 million active, state-issued permits to carry concealed handguns for self-defense outside the home. See, e.g., John R. Lott, *Concealed Carry Permit Holders Across the United States: 2018*. Most states today will issue a permit to carry a concealed handgun to an adult who passes a fingerprint-based background check and a safety class. (Chapter 1 details how some states vary from the standard practice.) Licensed carry provides a growing consumer market for small, easily carried handguns.

A Pew Research Center 2017 survey found that more than half of handgun owners carry their handguns outside of their home on some occasions (not including when they are transporting the gun). Additionally, the study found no significant differences in sex, education, region, or community among those who carry a handgun outside the home. See Pew Research Center, *America's Complex Relationship with Guns: An In-Depth Look at the Attitudes and Experiences of U.S. Adults* (June 2017).

Many modern handguns are constructed in part from lightweight plastic polymers, rather than metal. As a result, these guns are more comfortable for long-term carry, and are popular with both police and ordinary citizens. By federal law, the guns must include at least four ounces of metal, and the shape of the metal must visibly show a gun to x-ray metal detectors. See 18 U.S.C. § 922(p).



The frame of this pistol is made from plastic polymers. Note the double trigger, a safety mechanism on some modern pistols. The forward trigger is a safety. The rear trigger operates the gun like a standard trigger. To fire the gun, the shooter presses both triggers in one continuous motion.

Another popular use for handguns is target shooting. There are 18.4 million Americans who “currently participate” in target shooting with handguns, according to [a Harris Survey](#) for the National Shooting Sports Foundation (NSSF), the trade association for the firearms industry. Informal target shooting or “plinking” can be conducted at commercial shooting ranges and clubs, at public ranges, on undeveloped public lands, or on private property.

Organized target shooting with handguns takes numerous forms. In bullseye competition, participants stand in place and shoot at paper targets up to 50 yards away. In action pistol shooting, participants move through a course set up to simulate defensive shooting scenarios and are scored based upon time and accuracy in shooting “bad guy” targets, with large penalties for shooting the wrong target. Target pistol shooting is an international sport that includes Olympic competition. It was one of the original sports of the modern Olympics.

Hunting with handguns is allowed in every state, usually as part of the general firearms hunting season. All types of land animals can be successfully hunted in this way. For larger game, hunting handguns are typically large and powerful revolvers, often mounted with a telescopic sight. Scopes are also popular for handguns that are used for target shooting.



Ruger Mark III .22 caliber semi-automatic pistol, with scope.

d. Criminal Uses of Handguns

Crimes involving guns are committed predominantly with handguns. FBI statistics show that of 15,129 murders in the United States in 2017, 10,982 (over two-thirds) were committed with firearms, and of those, at least 7,032 (64 percent of firearm murders) were committed with handguns. Similarly, the U.S. Department of Justice's Bureau of Justice Statistics survey of federal and state prison inmates in 2016 indicates that 21 percent of state prisoners and 20 percent of federal prisoners reported being armed with a firearm during the offense for which they were incarcerated. Of those offenders who were armed, 88 percent reported being armed with a handgun, while only 7 percent reported possessing a rifle and about 8 percent reported possessing a shotgun. (Figures do not sum to 100 percent because prisoners could report possessing more than one type of firearm.) See U.S. Dep't of Justice, [Source and Use of Firearms Involved in Crimes: Survey of Prison Inmates, 2016](#). Thus, while handguns comprise a plurality of privately owned firearms, they are disproportionately used in gun crimes.

2. Rifles

Rifles typically are larger, have greater range and accuracy, and fire rounds at higher velocities than handguns. Federal law defines a rifle as

a weapon designed . . . and intended to be fired from the shoulder and . . . to use the energy of the explosive in a fixed cartridge to fire only a single projectile through a rifled bore for each single press of the trigger.

[28 U.S.C. § 5845](#)(c). Thus, a rifle is defined by two main traits.

- It is a *long gun*: the gun has a stock and is designed to be used with the stock braced against a shoulder.
- It has a *rifled bore*: the inside of the gun’s barrel is cut with a pattern of spiral grooves that rotate the bullet as it travels down the barrel.

The parts of the barrel that do not have the groove cuttings are called the *lands*. Caliber is a measure of barrel diameter from the lands. The rotation, like the spin on a properly thrown football, makes the bullet fly in a straighter path when it emerges from the muzzle of the gun—the open end of the barrel. Most modern handguns have rifled bores as well.

The ATF’s *Annual Firearms Manufacturing and Export Report* shows American manufacturers produced 4,239,335 rifles in [2016](#) and 2,504,092 rifles in [2017](#) (not including rifles for the U.S. military). Of those rifles, 147,044 and 158,871 were exported in 2016 and 2017. The ATF’s *Firearms Commerce in the United States Annual Statistical Update 2019* shows that 572,309 rifles were imported into the United States in 2017, while 652,031 were imported in 2018. Canada, Brazil, Japan, and Spain were the leading sources of imports in 2018.

a. Characteristics of Rifles

Rifles have greater accuracy than handguns or shotguns. Rifles can be fired more accurately than handguns because they have stocks braced against the shoulder for firing, and longer barrels. With a handgun, one or two hands hold the grip immediately behind the trigger, providing one point of contact with the firearm for stability. With a long gun, there are three points of contact: the stock against the shoulder, the trigger hand holding the stock or pistol grip immediately behind the trigger, and the nontrigger hand holding the fore-end of the gun. The rifle barrel also provides a longer sight radius (the distance between the rear and front sights) for greater accuracy. Rifles are more accurate than shotguns because the rifling in the barrel makes the conical or cylindrical bullet more aerodynamically stable. (Shotguns, discussed below, generally fire multiple spherical pellets, which are not nearly so aerodynamically stable.)

Rifles typically are more powerful than handguns, giving them greater range and impact. Most types of centerfire rifle ammunition deliver dramatically more kinetic energy than common handgun rounds. Consider the example of an ordinary bolt-action deer-hunting rifle in a popular medium game cartridge, the .270 Winchester, introduced in 1925. The .270 Winchester launches a 145-grain⁸ bullet through a 24-inch barrel at a velocity of 2,970 feet per second (more than 2.5 times the speed of sound), delivering more than 2,500 foot-pounds of kinetic energy to a target at 100 yards distance from the muzzle.⁹

8. A “grain” is 1/7,000 of a pound, or approximately 0.0648 gram. Grains are used for measurement of bullet weight, and for gunpowder. The term originally referred to the approximate weight of one grain of wheat.

9. [Hornady 270 Win. 145gr ELD-X Precision Hunter](#).

Compare this with a handgun firing a bullet of similar weight. The most widely used handgun round is the 9mm Luger. It fires a 147-grain bullet at a velocity of 1,000 feet per second (slightly less than the speed of sound) and delivers 273 foot-pounds of kinetic energy at 100 yards distance—about one-ninth of the energy of the rifle.¹⁰ Even a more-powerful handgun cartridge, such as the .40 Smith & Wesson, used by some law enforcement agencies, launches a 155-grain bullet at a velocity of only 1,140 feet per second (slightly more than the speed of sound), delivering about 313 foot-pounds of kinetic energy at 100 yards distance—about one-eighth the energy of the rifle.¹¹ At short distances—the distances at which handguns are typically used—the differences in kinetic energy are less dramatic. (See Chapter 11 Exercise: Ammunition-Based Controls, for more ballistic information of common ammunition.)

When fired from a stable rest with a telescopic sight, the .270 Win. rifle with a high-grade barrel can place a group of three shots within a one-inch diameter at 100 yards. Even a skilled pistol shooter would have difficulty keeping a group of shots within one inch at 25 yards with a typical police or self-defense handgun.

The ammunition capacity of rifles varies widely. Bolt-action rifles typically hold 5 or 10 rounds. Lever-action rifles range from 4 rounds to a dozen or more. Semi-automatic rifles use magazines that can range from 5 rounds up to 20 or 30 rounds. Specialized magazines with very high capacities of up to 75 or 100 rounds are available for some semi-automatic rifles, but such magazines are more prone to malfunctioning.

Some of the most popular rifles are rimfire rifles, particularly in the .22 Long Rifle chambering. The two most popular semi-automatic .22 rimfire rifles, the Marlin 60 (introduced in 1960) and the Ruger 10/22 (introduced 1964), have together accounted for more than 15 million rifles sold. These rifles are commonly used for target shooting, practice, and small-game hunting, or for self-defense, especially by persons who would have difficulty the recoil of a more powerful rifle.

b. Types of Rifles

Most rifles today can be categorized into four common types: bolt-action, semi-automatic, lever- or pump-action, and single shot.

i. Bolt-Action Rifles



Bolt-action rifle.

10. The are data for the [Federal 9mm Luger Personal Defense Hydra-Shok](#) round.

11. The are data for the [Federal .40 S&W Personal Defense Hydra-Shok](#) round.

Bolt-action rifles, introduced as military weapons in the late nineteenth century, are now the most commonly used rifle for hunting deer and other large game. Approximately 44 percent of the rifles purchased in the United States in the first four months of 2010 were bolt-action rifles. Debbie Thurman, *Target Long Guns*, Shooting Indus., Aug. 2010, at 33.

A bolt-action rifle holds several cartridges in its magazine. By manually lifting a handle attached to the bolt, pulling the handle back, and then returning the bolt to its starting place, the user can eject an empty case from the firing chamber, and load a fresh round into the chamber from the magazine.

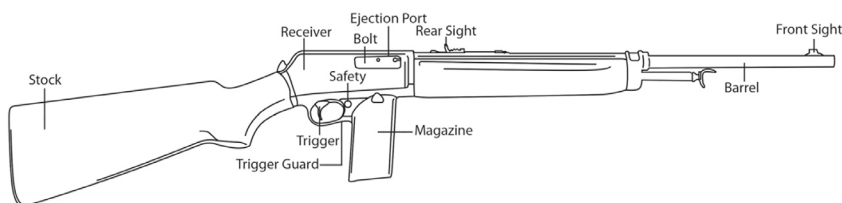
Along with single-shot rifles (discussed below), bolt-action rifles are usually the most accurate rifles, especially at longer distances. The reason is that the cartridge's fit inside the firing chamber is usually tighter than for other types of rifles.

ii. *Semi-Automatic Rifles*

The other leading type of rifle is the *semi-automatic* rifle. In recent years, sales of semi-automatic rifles have been comparable to bolt-action rifle sales: about 42 percent of the rifles sold in early 2010 were semi-automatic. *Id.*

A semi-automatic rifle functions in a manner similar to a semi-automatic pistol, discussed in Section D.1.a *supra*. Some of the energy produced by the burning gunpowder pushes the bullet forward, while an equal and opposite amount of energy dissipates in other directions and causes the firearm to recoil. The semi-automatic firearm uses some of this energy to cycle the rifle's action. Typically, the bolt moves backward inside the rifle's receiver, then returns back into place. The bolt's movement automatically ejects the now-empty cartridge case, cocks the hammer or other firing mechanism, and loads a fresh cartridge into the firing chamber, ready to be fired with the next press of the trigger. Other things being equal, a semi-automatic firearm will produce less felt recoil for the user than other types of firearms.

Semi-automatic rifles store and feed their ammunition from a magazine. Some use *fixed* internal magazines that are part of the rifle and are loaded by inserting ammunition through the top of the gun or into a tube that runs parallel to the rifle's barrel. Other semi-automatic rifles use *detachable* magazines that can be quickly swapped out when empty and replaced with other loaded magazines.



The major external parts of a semi-automatic rifle.

Because the use of recoil energy or diversion of gases in the semi-automatic action significantly reduces felt recoil, semi-automatics can be easier to use by persons who do not have great upper-body strength. For all users, the reduced recoil helps keep the muzzle on target, increasing the accuracy of a second shot. Many hunters trade off the long-range accuracy of a bolt action for the better second-shot accuracy of a semi-automatic, especially at medium or shorter ranges. The reduced recoil and greater accuracy for second or subsequent shots also have obvious self-defense utility. Additionally, firearms with detachable magazines (i.e., most semi-automatic rifles and handguns, and some bolt-action rifles) typically can be reloaded more quickly than other firearms, especially by nonexperts. Although most gun fights are over after just a few shots, many police and citizens prefer the ability to quickly reload if necessary.

Some popular models of semi-automatic rifles are chambered in the .22 Long Rifle rimfire cartridge and are used for recreation, target shooting, training new shooters, and hunting small game. Millions of relatively inexpensive semi-automatic .22 rifles have been sold.



A pair of .22 caliber semi-automatic rifles. This is the same gun in two different configurations. The one in back has a traditional wood stock, while the one in front has a modern plastic polymer stock. The black gun also has a rail for mounting a riflescope, and it has a muzzle brake (mounted on the muzzle), which stabilizes barrel vibration so that the user more easily can stay on target for the second shot.

The most popular general-purpose rifle in America is the semi-automatic AR-15. The “AR” stands for “ArmaLite,” the company that developed the prototype rifle in the late 1950s that later became the military M16 and civilian AR-15. Americans own an estimated 15 million AR-15 variants and “the AR-15 remains a jewel of the gun industry, the country’s most popular rifle, irreversibly lodged into American culture.” Jon Schuppe, [America’s Rifle: Why So Many People Love the AR-15](#), NBC News, Dec. 27, 2017.

While the AR-15 looks like the fully automatic military M4 carbine or M16 rifle, it has a semi-automatic-only firing mechanism like most modern handguns. The M4 and M16 are “select” or “selective” fire weapons, meaning that

they can be fired either in semi-automatic mode or automatic mode (or three-round burst mode, depending on the model) by toggling a selector switch on the side of the rifle. A fully automatic weapon like the M4 or M16 is a machine gun—it fires continuously so long as the shooter presses and holds the trigger. A semi-automatic firearm like the AR-15 is not a machine gun—it fires only one bullet for each pull of the trigger.

The Supreme Court in *Staples v. United States*, 511 U.S. 600, 603 (1994) (Ch. 7.E.4), described the basic difference between the AR-15 and the M16: “The AR-15 is the civilian version of the military M-16 rifle, and is, unless modified, a semi-automatic weapon. The M-16, in contrast, is a selective fire rifle that allows the operator, by rotating a selector switch, to choose semi-automatic or automatic fire.”



AR-15-type semi-automatic rifles.

AR-15-type rifles are used for lawful purposes such as self-defense, hunting, competitive shooting, and target practice. They come in a variety of calibers and barrel lengths. Most AR-15s are chambered for the .223 Rem./5.56 NATO round (*see supra* Section B.2). AR-15-style rifles also can be chambered for other calibers, such as the .22 Long Rifle, .223 Wylde, .224 Valkyrie, and .300 Blackout. Large frame AR models (AR-10s) typically are chambered for the .308 Winchester (Win.) and 6.5 Creedmoor, but also can include other calibers such as .243 Win., .260 Rem., and 6mm Creedmoor. The AR-platform also includes pistol-caliber carbines (called PCCs or AR-9s) that fire 9mm rounds used in popular handguns.

AR-15 rifles typically are fitted with carbine-length barrels (14.5 or 16 inch) or rifle-length barrels (18 or 20 inch). The 14.5-inch barrel must have a pinned and welded muzzle device (compensator or flash hider) to bring its length to 16 inches or it will be classified as a *short-barrel rifle* under the National Firearms Act

(NFA) (*see* Chapter 7). Short-barrel AR-15 rifles requiring a tax stamp under the NFA are popular in barrel lengths ranging from 9 to 12.5 inches.

The AR-15 chambered for .223 Rem./5.56 NATO ammunition is especially suitable for home defense. While handguns are easier to maneuver and store and shotguns have devastating firepower at short distances, the AR-15 carbine offers several advantages as a primary home defense weapon:

- The AR-15 has far less recoil than shotguns and less recoil than most other rifles and handguns. Less recoil makes the AR-15 easier to shoot and speeds follow-up shots.
- The AR-15's lighter weight, shorter barrel, and ergonomic stock and grip make it easier to handle than shotguns and most other rifles.
- The AR-15 can be equipped with a red-dot sight or low-power scope for more accurate aiming. Lights and lasers easily can be attached to the AR-15's handguard for better identification and targeting. Scopes and lights can be added to most firearms, but the AR-15 is famously easy to accessorize because it often comes with rails that make accessorizing simple. Because of easy customization, the AR-15 has been compared to the Mr. Potato Head toy.
- The AR-15's standard 30-round magazine is larger than standard semi-automatic handguns (15-18 rounds), revolvers (5-6 rounds), and shotguns (3-6 rounds). This ensures that the operator is prepared for a variety of defensive scenarios without carrying additional ammunition and pausing to reload, such as when confronting multiple attackers in a home invasion.

The AR-15 provides 30 rounds of highly effective ammunition in a package that allows high accuracy, low recoil, and a convenient mounting system for lights and optics. These features make it easier for most persons to hit human-sized targets at in-house distances in low-light conditions under stress. Handguns are more likely to be used in multiple defensive settings and persons who use firearms for self-defense should develop a handgun skill set. But the handgun's concealability advantages make little difference inside the home. Handguns require a higher degree of skill to shoot accurately than AR-15s and hold half as many rounds. Shotguns are highly lethal at close ranges, but they hold an even smaller number of rounds. It is unrealistic to expect the average person to reload a shotgun under the life-or-death conditions of home defense.

Some argue that overpenetration by AR-15 rounds makes the AR-15 too dangerous for home defense. Bullets fired in a home can go through interior and exterior walls and hurt innocent persons. *Any* defensive pistol or rifle ammunition that will effectively penetrate a human target will go through drywall, sheetrock, and other wall materials if the shooter misses. Ordinary defensive 9mm hollow-point pistol rounds, for example, will penetrate several sheets of drywall. While tests have shown that hollow-point .223/5.56 rounds generally penetrate less than hollow-point handgun rounds, both are capable of penetrating multiple interior walls, as well as exterior house walls. Still, almost every military or law enforcement team that must fight inside houses and can choose its own weapons selects an M4/AR-15 variant.

Persons who choose to use a firearm for home defense should select a firearm that gives the highest probability of hitting the threat, should train and practice for accuracy, and must know what is beyond the target. Handguns, rifles, and shotguns all have advantages and disadvantages for lawful self-defense in the home, so it is impossible to say which firearm is “best” for home defense in every case.

The AR-15 rifle platform also can be configured for a variety of sporting and hunting applications. It is the primary type of rifle used in organized centerfire rifle-shooting events such as [the NRA High Power Rifle competition](#). (“High power” in the competitive shooting context means anything larger than .22 caliber.) According to the National Shooting Sports Foundation’s *Report on Sport Shooting Participation in the United States in 2014*, about one-third of hunters use “modern sporting rifles” (i.e., AR-15-type rifles) for hunting. Due to the increased popularity of AR-15-type rifles, ammunition manufacturers have developed various cartridges suited for hunting small varmints, feral hogs and goats, coyotes, deer, and other animals. See Will Drabold, [Here Are 7 Animals Hunters Kill Using an AR-15](#), Time, July 6, 2016.

Many law enforcement agencies supply their officers with semi-automatic AR-15 “patrol rifles” chambered in .223 Rem./5.56 NATO to supplement the officers’ service pistols. They choose the AR-15 for its accuracy, ease of use, utility for diverse defensive scenarios, less danger of overpenetration, and reliability, as well as two characteristics common to almost all rifles: higher-velocity rounds and the ability to penetrate soft body armor. See, e.g., Massachusetts Municipal Police Training Committee, *Basic Firearms Instructor Course: Patrol Rifle Manual* 3-7 (2007) (discussing advantages of AR-15 patrol rifle).

While AR-15-type rifles are the most common in their category, there are many other popular semi-automatic rifles, such as the Ruger Mini-14 and Mini-30. The fully automatic AK-47 (and its descendants, the AK-74 and AKM) is the most common rifle in much of the world. Designed for the Soviet Union and its allies by Mikhail Kalashnikov in 1947, the AK-47 is extremely durable and reliable, even under very adverse environmental conditions. Semi-automatic variants of the Kalashnikov design were popular in the American market in the 1980s, but are relatively less so today as the more customizable and more accurate ARs have eclipsed them. One reason is that there is a great deal of American consumer resistance to imported Chinese firearms, so the Chinese semi-automatic AKs are much less popular in the United States than might be expected based on their relatively low prices. However, fully automatic Chinese AKs can be found throughout many developing countries—in the hands of ordinary persons, warlords, organized criminals, and anyone else with ready cash to pay China’s government affiliated manufacturers, who produce reliable firearms that they sell without scruples.

Gun control advocates (and oftentimes the media) refer to AR-15-type rifles as “assault weapons” and typically use machine-gun terms to describe these rifles, even though AR-15s are not fully automatic weapons. While “assault weapon” is an elastic marketing term, the term “assault rifle” has a precise and long-standing definition. According to the Defense Intelligence Agency, “assault rifles” are “short, compact, selective-fire weapons that fire a cartridge intermediate in power between a submachine gun and rifle cartridges.” Defense Intelligence Agency, Small Arms Identification and Operation Guide—Eurasian

Communist Countries 105 (Gov't Print. Office, 1988) (same definition in earlier editions). In other words, an “assault rifle” is a midsize portable rifle that the user can fire automatically or semi-automatically. The first such rifle was the German Sturmgewehr, introduced in 1943. The Soviet AK-47 and the U.S. M-16 are also assault rifles.

“Assault weapon” is a term that has literally been used to describe almost every type of gun—including air guns, paintball guns, most shotguns, most handguns, or most rifles. David B. Kopel, *Defining “Assault Weapons,”* The Regulatory Rev. (Univ. of Penn.), Nov. 14, 2018 (citing “assault weapon” laws covering various guns). Sometimes “assault weapons” are said to be “weapons of war” with “spray fire” capability. Some laws define “assault weapons” by the presence of one or more features on a firearm, such as a forward grip on a long gun, barrel covers or extensions to improve grip and accuracy, adjustable stocks to fit the user’s size, bayonet lugs, or detachable magazines.

Under diverse definitions, “assault weapons” currently are banned in California, Connecticut, the District of Columbia, Hawaii, Maryland, Massachusetts, New Jersey, and New York, as well as in local jurisdictions in Illinois. Some other jurisdictions, such as Washington State, impose special regulations. None of the legislative classifications are based on the guns’ rate of fire or power.

From 1994 to 2004, United States federal law contained a similar set of restrictions. [The Public Safety and Recreational Firearms Use Protection Act](#), formerly at 18 U.S.C. § 922(v) (1994), prohibited the manufacture for sale to private individuals of defined “assault weapons,” including the AR-15. The federal ban also prohibited the manufacture for sale to private individuals of detachable rifle or handgun magazines holding more than ten rounds. *Id.* § 922(w). However, the federal assault weapons ban included a sunset clause, which caused the law to expire by its terms on September 13, 2004, ten years after its passage. Today, these rifles are no longer specially regulated by federal law, although they are, like other firearms, regulated by the federal [Gun Control Act of 1968](#) (Ch. 8).

While the Supreme Court has never addressed the constitutionality of “assault weapon” bans, five federal circuit courts have upheld such bans against Second Amendment challenges. See [Worman v. Healey](#), 922 F.3d 26 (2d Cir. 2019); [Kolbe v. Hogan](#), 849 F.3d 114 (4th Cir. 2017) (Ch. 11.E Note 9); [New York State Rifle and Pistol Ass’n v. Cuomo](#), 804 F.3d 242 (2d Cir. 2015) (Ch. 11.E); [Friedman v. City of Highland Park, Illinois](#), 784 F.3d 406 (7th Cir. 2015) (Ch. 11.E); [Heller v. District of Columbia](#), 670 F.3d 1244 (D.C. Cir. 2011) (Ch. 11.A) (*Heller II*). For more on the constitutionality of such bans, see Chapter 11.

Several courts upholding “assault weapon” bans have made erroneous or misleading factual claims about the design and operation of AR-15s. For example, both *Heller II* and *Kolbe* identify the banned AR-15s as “weapons of war,” even though no national military uses a service rifle that is semi-automatic only. *Friedman* describes the banned “assault weapons” as being “designed to spray fire rather than to be aimed carefully,” which is contrary to both the design and capability of the firearm. *Kolbe* concludes that the rate of fire for the semi-automatic AR-15 is “nearly identical” to the fully automatic military M16 and cites a source claiming that semi-automatic rifles can be fired at rates of 300 to 500 rounds per minute. Because the AR-15 is a semi-automatic weapon and fires only one round with each pull of the trigger, such a rate of fire would require the operator to pull the trigger five to eight times per *second*. The AR-15’s actual rate of fire is similar to modern semi-automatic pistols rather than the military’s

fully automatic weapons. Most shooters can fire at most two to three rounds per second at a single, stationary target.

For articles refuting popular misconceptions about the design and operation of the AR-15, see E. Gregory Wallace, “Assault Weapon” *Lethality*, 88 Tenn. L. Rev. (forthcoming 2021), and E. Gregory Wallace, “Assault Weapon” *Myths*, 43 S. Ill. U. L.J. 193 (2018), and David B. Kopel, *Rational Basis Analysis of “Assault Weapon” Prohibition*, 20 J. Contemp. L. 381 (1994).

iii. *Lever-Action Rifles and Pump-Action Rifles*

Lever-action rifles, the first repeating rifles, were introduced before the American Civil War. The user can manually eject a spent round and chamber a fresh round by cycling a lever assembly attached to the rifle’s trigger guard. Lever-action rifles, such as replicas of the famed [Winchester 1873 rifle](#), are still fairly popular today for hunting. They are widely used in the self-consciously nostalgic sport of cowboy action shooting, in which participants wear Western clothing and shoot cowboy-themed target courses using firearms of nineteenth-century design. Pump- or slide-action rifles operate like shotguns of the same type, discussed *infra*.



Winchester Model 1873 lever-action rifle.

iv. *Single-Shot Rifles*

Single-shot rifles are still produced. They are simple and often economically priced. After firing, the cartridge must be removed or ejected from the breech of the rifle and replaced by hand. Single-shot rifles typically are highly accurate for hunting and for long-distance target shooting.

c. *Legitimate Uses of Rifles*

As explained above, rifles commonly are used for self-defense, hunting land animals, and target shooting. According to the National Shooting Sports Foundation’s *Report on Sport Shooting Participation in the United States in 2014*, a total of 21.9 percent of all Americans went target or sport shooting in the previous year. Of that number, 59.8 percent used a traditional rifle and 31.7 percent used a modern sporting rifle (i.e., AR-type rifle) (multiple responses were allowed). For those who used a firearm for hunting, 69 percent used a traditional rifle and 31 percent used a modern sporting rifle (multiple responses allowed).

d. Criminal Uses of Rifles

Rifles are not commonly used in violent crime. According to the U.S. Department of Justice’s 2016 Bureau of Justice Statistics survey of federal and state prison inmates, 21 percent of state prisoners and 20 percent of federal prisoners reported being armed with a firearm during the offense for which they were incarcerated. Of those offenders who were armed, only 7 percent reported possessing a rifle. See U.S. Dep’t of Justice, *Source and Use of Firearms Involved in Crimes: Survey of Prison Inmates, 2016*. The FBI’s report on *Crime in the United States* indicates that 10,982 murders were committed with firearms in 2017. For the 7,886 murders about which the type of firearm is known, 7,032 were committed with handguns, while only 403 were committed with rifles. This is about 5 percent of murders committed with firearms.

Handguns are the most common firearm used in mass shootings, accounting for over 50 percent. According to one database, semi-automatic rifles, including AR-15-style rifles, have been used in about 29 percent (33 of 115) of mass shootings since 1982. *Mother Jones Mass Shootings Database 1982-2019* (last updated August 31, 2019). According to FBI data, rifles of all types were used in less than one-third of 277 active shooter incidents from 2000-18.¹²

Rifles have figured prominently in political assassinations. In the 1960s, President John F. Kennedy and civil rights leader Rev. Martin Luther King, Jr., were both killed by assassins firing rifles from concealment. Today, one challenge of protecting dignitaries from assassination stems from the threat posed by potential assassins armed with rifles.

3. Shotguns

Shotguns are the third major category of common firearms. The ATF’s *Annual Firearms Manufacturing and Export Report* for 2017 shows that 653,139 shotguns were manufactured that year in the United States and 29,997 were exported. The ATF’s *Firearms Commerce in the United States Annual Statistical Update 2018* shows that 632,105 shotguns were imported into the United States in 2017, with Turkey, China, and Italy the leading sources.

Federal law defines a shotgun as a firearm that is

intended to be fired from the shoulder . . . [and uses] the energy of the explosive in a fixed shotgun to fire through a smooth bore either a number of projectiles (ball shot) or a single projectile for each pull of the trigger.

28 U.S.C. § 5845(d). Thus, a shotgun is a long gun with a *smooth bore*, a barrel whose interior lacks the spiral rifling grooves found in rifles and handguns.

12. The FBI has published *Active Shooter Incidents in the United States* for 2000-13, 2014-15, 2016-17, and 2018. The FBI defines an active shooter incident as involving an individual or individuals actively engaged in killing or attempting to kill people with a firearm in a populated area. It excludes shootings that resulted from gang or drug violence.

a. Shotgun Shells

Shotguns use ammunition that differs in several respects from handgun or rifle ammunition. While handgun and rifle cartridges use metallic *cases*, shotgun cartridges use cylindrical *shot shells* with plastic cases (or in previous times, paper cases).



Shotgun shells, pictured next to rifle and handgun cartridges for scale.

A typical shot shell is filled with round metal *shot pellets* that are released when the shell is fired. Shot shells range from *birdshot* loads, the smallest of which fit hundreds of tiny pellets into a single shell, to *buckshot* loads, which use much larger and heavier pellets, sometimes as few as eight or nine pellets per shell.

Shotguns are commonly used for bird hunting. Larger loads with fewer pellets are used for bigger birds, such as geese, while loads containing tiny pellets are standard for small birds. The largest pellets (buckshot) are used for hunting deer or for police work and self-defense.

Other than the differences in casing, and the use of round pellets rather than conical bullets, shotgun ammunition works the same as rifle or handgun ammunition.

Traditionally, shot pellets have been made of lead, like most handgun and rifle bullets. However, concern about the effects of ingested lead on animals has led to restrictions on its use in hunting. In 1991, the U.S. government banned the use of lead shot while hunting waterfowl in the United States. [50 C.F.R. §§ 20.21\(j\), 20.134](#). Ammunition manufacturers now sell a variety of shotgun shells loaded with nonlead shot composed of other metals, such as bismuth, tin, steel, and tungsten. These nonlead alternatives are widely used for shotgun hunting today, although some argue that they remain inferior to lead shot in performance, price, or both.

Not all shotgun shells contain multiple pellets; they can also be loaded with a single, large-bore projectile, a shotgun *slug*. Shooting slugs lets the shotgun function similarly to a powerful rifle at short ranges. The typical use for a shotgun slug would be deer hunting, police work, or self-defense. (Some specialty shotguns for slugs may have rifling inside the barrel, which by federal law makes them “rifles,” although everyone still calls them “shotguns.”)

Some shotgun shells contain nonlethal loads, including rubber pellets, bean bags, pepper spray and chemicals, and flash bangs. Like rubber bullets, *supra*, they are intended to bruise and disorient targets. Chemical and flash-bang loads are further intended to partially incapacitate and confuse targets. They are often used by law enforcement for crowd control and to deter further action.

b. Shotgun Gauges

Rifle and handgun calibers are measured in inches (e.g., .22, .357, .45) or millimeters (e.g., 5.56mm, 9mm). This is straightforward measurement of the width of the gun's bore diameter. Shotgun calibers also indicate the gun's bore diameter, but in an indirect measurement called *gauge*. A shotgun's gauge corresponds to the number of lead balls, of the same diameter as the shotgun's bore, that weigh one pound. If 12 lead balls of the shotgun's diameter weigh one pound, the shotgun is 12 gauge. If shotgun bore is slightly smaller, requiring 16 lead balls to weigh one pound, the shotgun is 16 gauge. The lower the gauge number, the wider the gun's bore, and thus the wider the shell that the shotgun can shoot.

Twelve gauge is most common in the United States. Its bore is .729 inches wide. Other popular modern gauges are 10, 16, 20, 24, and 28. (Historically, there are plenty of other shotgun gauges, such as 8 or 32.) The .410 shotgun is also common today. It has the smallest bore diameter, and its caliber is expressed in inches, not gauge.

c. Types of Shotguns



Pump shotgun.

Like rifles and handguns, shotguns are available as single-shot guns. Like single-shot rifles, single-shot shotguns have often been a youngster's first firearm, a rite of passage. As with rifles, repeating shotguns are far more common than single-shots.

The most common repeating shotgun in the United States is the *pump action*. The pump shotgun stores shells in a tubular magazine underneath the barrel. Wrapped around the magazine is a wood or plastic fore-end. To eject an empty shell and load a fresh one, the user pumps the fore-end backward and then forward. Pump actions are also called *slide actions*. (The same words are also used for similar rifles.) Pump shotguns typically hold from three to eight shells. They are less expensive to manufacture than semi-automatic or double-barreled shotguns. They are widely used for police work, self-defense, hunting, and rural control of pests and predators.

Semi-automatic shotguns function similarly to other semi-automatic firearms. When the shotgun is fired, the recoil energy or gas released by firing causes a reciprocating bolt to eject the spent shell and load a fresh shell into the firing chamber, ready to be fired with another press of the trigger. Unlike semi-automatic pistols and rifles, semi-automatic shotguns rarely use detachable ammunition magazines. As with pump-action shotguns, three to eight shells are typically stored in a fixed magazine tube that runs underneath the shotgun's barrel. The few shotguns that use a detachable box magazine, or a revolving cylinder, for ammunition storage have been subjected to special controls. *See* [ATF Rul. 94-2](#) (classifying such shotguns as a "destructive device" under 26 U.S.C. § 5845(f)(2)); Ch. 7.E.4, question 3.

Double-barreled shotguns have no magazine. Instead, they feature two adjacent barrels that can each be loaded with a shell, allowing a total of two shots before reloading. "Over/under" double-barreled shotguns place one barrel atop the other. "Side by side" shotguns orient the barrels alongside one another. Double-barreled shotguns are popular for skeet, trap, and sporting clays (below). Double-barreled shotguns are offered at a range of price points, but high-quality examples are very expensive, often boasting fine wood and engraving. Such shotguns are used mainly for sporting purposes such as competition and bird hunting. Many countries with very restrictive firearms laws, such as the United Kingdom, impose relatively less regulation on double-barreled shotguns. *See* Ch. 14.C.1.

d. Legitimate Uses of Shotguns

Shotguns are commonly used for hunting, especially bird hunting, for shooting sports such as trap shooting, skeet shooting, and sporting clays, for self-defense, for police work, and for protection from threatening or pest animals in rural areas. They also play a limited role in military operations—they are useful for security duty and for fighting in buildings or other close quarters. Some states, such as Illinois, Massachusetts, New Jersey, and Ohio, disallow the use of rifles for hunting deer. In these areas, it is common for deer hunters to employ shotguns loaded with buckshot or, most commonly, slugs.

Shotgun sports are one of the most popular organized shooting sports in the United States. In addition to hunting, popular shotgun sports are trap

shooting, skeet shooting, and sporting clays. Trap and skeet shooting were both created to simulate bird shooting. In both sports, the shooter tries to hit flying clay disks. Trap and skeet shooting take place on specially constructed target ranges. The differences between trap and skeet are whether the shooter stays in a single spot or rotates among five different shooting positions along about a quarter of a circle, and whether the clay “birds” are released from one fixed position or two.

The shotgun sport of sporting clays, invented in the latter twentieth century, also involves firing at flying clay targets. However, the sporting clays course involves ten different shooting positions in a large outdoor area. Participants shoot clay targets in a variety of natural settings that present differing terrain and obstacles. At each position, the shooter will fire at two different flying clays. While the flight paths of the clays in trap and skeet are relatively fixed, the flying patterns in sporting clays are much more diverse. One sporting clays stand might involve a first shot at a clay bouncing along the ground, and a second shot at a clay flying almost straight up into the air.

According to the National Shooting Sports Foundation’s *Report on Sport Shooting Participation in the United States in 2014*, an estimated 13 million participate in sporting clays, 12.6 million in skeet shooting, and 11.2 million in trap shooting.

Shotguns can be used for military purposes, particularly at close range. They were common in World War I as “trench guns,” had an important role in the Vietnam War, and are still used for specialized purposes. The bulk and weight of their ammunition, however, make them unsuitable for extended carrying. At distances beyond a few dozen yards, the much greater accuracy of the rifle makes it the preferred military arm.

Some firearms trainers recommend the use of a shotgun instead of a handgun for home defense. They emphasize that the shotgun is much more powerful than the handgun and that the use of a shoulder stock enables the shotgun to be aimed more accurately under stress than a handgun. Other trainers point out that the shotgun’s heavy recoil can make it difficult for small-statured shooters or those with limited upper-body strength to use a shotgun effectively for self-defense. The shotgun’s limited ammunition capacity could also be a disadvantage for home defense, as it would be very difficult for the average operator to reload quickly under the stress of a defensive situation.

All firearms, and other arms, have their particular advantages and disadvantages for lawful self-defense. Individual ergonomics vary widely, and individual circumstances even more. The choice of defensive arms is a very personal decision.

e. Criminal Uses of Shotguns

Shotguns are used far less frequently than handguns in murders. The FBI’s report on *Crime in the United States* indicates that 10,982 murders were committed with firearms in 2017. For the 7,886 murders about which the type of firearm is known, 7,032 were committed with handguns, while 403 were committed with rifles and 264 were committed with shotguns.

The U.S. Department of Justice’s Bureau of Justice Statistics survey of federal and state prison inmates in 2016 indicates that 21 percent of state prisoners and 20 percent of federal prisoners reported being armed with a firearm during the offense for which they were incarcerated. Of those offenders who were armed, only about 8 percent reported possessing a shotgun. See U.S. Dep’t of Justice, *Source and Use of Firearms Involved in Crimes: Survey of Prison Inmates, 2016*.

Criminals carrying shotguns sometimes will saw off much of the barrel (an act that is illegal under federal law, see Ch. 7.C). The sawed-off shotgun is not very accurate, but (like any shotgun) is devastating at close range.

E. Specialty Types of Firearms and Accessories

1. Muzzleloaders

All of the types of modern firearms described above are sometimes called *breech-loading* guns: the user loads the gun’s ammunition into the firing chamber from the gun’s *breech*, that is, the rear of the barrel.

The first firearms were *muzzleloaders*. They were loaded from the front of the gun, the *muzzle*. The flintlock muskets and rifles used by the American pioneers and by soldiers in the American Revolution are examples of historically significant muzzleloading firearms.

To load a muzzleloading gun, the user pours a charge of black powder down the *front* of the barrel (i.e., the muzzle) and then uses a ramrod to ram a bullet or round ball projectile down the muzzle, covering the powder charge. Introducing a spark into the firing chamber ignites the powder and fires the gun with an accompanying large cloud of smoke.

To provide the priming spark, the flintlock muzzleloaders of the seventeenth and eighteenth centuries used a small amount of fine gunpowder in a small pan just behind the breech. When the user pulled the trigger, flint struck steel, producing a spark to ignite the powder in the pan. In the early nineteenth century, self-contained *percussion caps* were invented. Placed on a small nipple near the gun’s breech, the primer cap detonated when struck by the gun’s hammer. These were the ancestors of today’s centerfire primer cups.

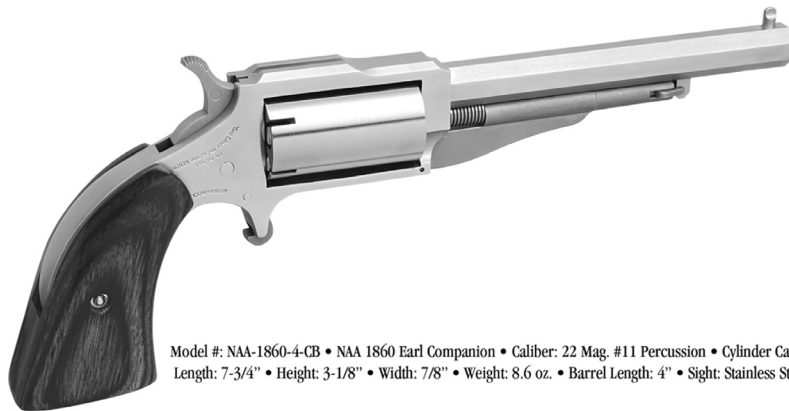
Most muzzleloaders can only fire a single shot. After that, the slow loading process must be repeated. As of the time of the Revolution, an average shooter could fire about three shots per minute, a proficient user up to five.

Repeating muzzleloaders date back to the fifteenth century but were expensive. The first repeating muzzleloaders to win a big place in the mass market were the “pepperbox” handguns introduced around 1830. See Ch. 5.C.5.a. These were ancestors of the revolver. With rotating barrels, they most often held 4 or 8 rounds, and sometimes up to 24.

Muzzleloaders are technologically obsolete, but their features and traditional quality give them an appeal to hunters and historical firearms aficionados. Today, many states maintain special “muzzleloading” or “black powder”

hunting seasons in addition to the regular firearms hunting seasons. Hunters willing to use single-shot, muzzleloading rifles receive the benefits of a separate season to hunt, usually before the regular hunting season begins. The growing popularity of muzzleloading hunting has fueled a steady improvement in the sophistication of commercial muzzleloading firearms. It is now possible to purchase muzzleloaders that, apart from their one-shot capacity and slow loading procedure, have the features of a high-quality modern hunting rifle. Some are even strong enough in construction that they can use smokeless gunpowder. Most modern muzzleloaders use commercial black powder “substitutes” that have similar burning properties to traditional black powder, but are more stable in storage and easier to clean. In modern muzzleloaders, the gunpowder is not loose, but is a cylindrical pellet. Modern replicas of old-fashioned flintlocks are also popular today, thanks in part to the build-at-home kits that became available about a half-century ago.

Muzzleloading firearms have a distinctive legal status. Under current federal law, muzzleloading firearms, including “cap and ball” revolvers, are much less closely regulated by federal law than modern, cartridge-using firearms. The Gun Control Act of 1968 classifies black powder rifles, shotguns, and handguns as “antique firearms” that are exempt from federal regulation, as long as the guns cannot use fixed (cartridge) ammunition. *See* 18 U.S.C. § 921(a)(4), (a)(16)(C). Individuals can order many kinds of black powder muzzleloading firearms directly through the mail or the Internet.



Model #: NAA-1860-4-CB • NAA 1860 Earl Companion • Caliber: 22 Mag. #11 Percussion • Cylinder Capacity: 5
Length: 7-3/4" • Height: 3-1/8" • Width: 7/8" • Weight: 8.6 oz. • Barrel Length: 4" • Sight: Stainless Steel Post

This North American Arms revolver is a muzzleloader. To load the gun, one removes the revolving cylinder from the frame of the gun. After that, one rams gunpowder and then a bullet into each of the five cylinder chambers, from the front. Finally, one places percussion caps on the back of each cylinder chamber, and then puts the cylinder back into the gun.

2. Machine Guns

Federal law defines any firearm that can fire more than one shot per press of the trigger as a machine gun—or rather, to use the actual spelling found in the National Firearms Act of 1934 (Ch. 7.D.7), a “machinegun.”

The term “machinegun” means any weapon which shoots, is designed to shoot, or can be readily restored to shoot, automatically more than one shot, without manual reloading, by a single function of the trigger. The term shall also include the frame or receiver of any such weapon, any part designed and intended solely and exclusively, or combination of parts designed and intended, for use in converting a weapon into a machinegun, and any combination of parts from which a machinegun can be assembled if such parts are in the possession or under the control of a person.

26 U.S.C. § 5845(b). The standard infantry weapons of national armies today are machine guns, including the U.S. military’s M4 and M16 rifles as well as the AK-47 and AK-74 rifles of the former Soviet bloc nations. Each of the rifles is capable of at least one type of automatic fire, and some can do both: in “fully automatic” fire the gun keeps firing as long as the trigger is held down, until the ammunition runs out; in “burst” fire, a single trigger press fires two or three shots automatically.

Automatic firearms available to civilians are closely regulated by the federal government under the National Firearms Act (Ch. 7.D.7) and the Firearms Owners’ Protection Act (Ch. 8.D). Possession of a machine gun is illegal unless the possessor has completed extensive tax and registration requirements. Ch. 7.E.

Federal law was amended in 1986 to ban the private possession of machine guns manufactured after May 19, 1986. *See* Firearms Owners’ Protection Act, 18 U.S.C. § 922(o). Only machine guns that were lawfully registered prior to that date may be owned and transferred pursuant to the National Firearms Act. In effect, the 1986 federal ban created a fixed pool of somewhat more than 100,000 legally “transferable” machine guns, to which no new guns can be added. This scarcity, as you might predict, has caused the price of transferable machine guns to climb steadily in the decades since the ban was enacted. Prices currently begin at around \$3,000 for the simplest models and range upward to \$25,000 or more for rare or high-quality weapons.

Federal law uses the term “machinegun” to mean a fully automatic firearm, but there is a technical distinction. The Gatling Gun, invented during the Civil War, is an example of a machine gun that is not fully automatic. The Gatling Gun is powered by a hand crank, rather than energy from the firing of ammunition. Gatling Guns, and other nonautomatic machine guns, are not covered by the National Firearms Act.

The Bureau of Alcohol, Firearms, Tobacco, and Explosives (ATF) issued a [final rule](#) in December 2018 designating bump-stock-type devices (bump-stocks, slide-fire stocks, and similar devices) as machineguns under the National Firearms Act. The ATF explained that

these devices convert an otherwise semi-automatic firearm into a machinegun by functioning as a self-acting or self-regulating mechanism that harnesses the recoil energy of the semi-automatic firearm in a manner that allows the trigger to reset and continue firing without additional physical manipulation of the trigger by the shooter. Hence, a semi-automatic firearm to which a bump-stock-type is attached is able to produce automatic fire with a single pull of the trigger.

Bump-stock-type devices are not used by the military or law enforcement, are notoriously inaccurate and prone to misfiring, and are not particularly

useful for target shooting or self-defense. Their utility was purely recreational, in that a user at a shooting range is able to simulate something like automatic fire. Until the tragic mass shooting in Las Vegas in September 2017, bump-stock-type devices had not been used in any crime. Whether the ATF correctly determined that bump-stock-type devices are machineguns under federal law and whether the ATF can ban such devices without congressional legislation will be resolved in litigation.

3. Silencers or Suppressors

A silencer (also called a suppressor) is a mechanical device that reduces the sound created by firing a gun, much as an automobile muffler reduces the sound created by running the car's motor. It usually takes the form of a can-like cylinder that attaches to the muzzle of the gun.



Suppressor attached to firearm.

Many consider “suppressor” to be a more correct term than “silencer” because the devices reduce noise but do not render a firearm even close to silent. (This is an important difference between real suppressors and ones portrayed in movies.) “Silencer” is the term used in federal law:

The terms “firearm silencer” and “firearm muffler” mean any device for silencing, muffling, or diminishing the report of a portable firearm, including any combination of parts, designed or redesigned, and intended for use in assembling or fabricating a firearm silencer or firearm muffler, and any part intended only for use in such assembly or fabrication.

18 U.S.C. § 921(a)(24). Thus, both terms refer to the same device and can be used interchangeably. “Silencer” is the legal term, while “suppressor” is the technical term.

The effect of suppressors is widely misunderstood and sometimes misrepresented. Gun control advocates have claimed, for example, that using a silencer makes a gun “quiet” so active shooters can inflict harm without being detected by potential victims or police. Suppressors reduce a gunshot sound by about 30

decibels on the average. The typical gunshot is about 160 decibels, so a suppressor will lower the noise to 130 decibels, which still is as loud as a jackhammer and louder than a chainsaw. The primary benefit of suppressors for civilian use is hearing protection. *See* Ch. 7.E.

Silencers purchased by civilians in the United States are highly regulated under the National Firearms Act. Like the possession of a machine gun, the possession of a silencer is illegal unless the possessor first completes extensive tax and registration requirements. However, there is no ban on the manufacture of new silencers. Eight states (California, Delaware, Hawaii, Illinois, Massachusetts, New Jersey, New York, and Rhode Island) and the District of Columbia currently ban civilian ownership of silencers. In many European countries, suppressors are not regulated as strictly as in the United States. Instead, suppressors are commonly available and are frequently used to reduce “noise pollution” from hunting and target shooting near inhabited areas.

4. Armor-Piercing Ammunition

Federal law and some states restrict the manufacture, sale, and possession of bullets whose composition makes them unusually effective at penetrating modern body armor such as the bullet-resistant vests worn by police officers. Federal law prohibits the manufacture of “armor piercing ammunition,” except for sale to government agencies, and prohibits federally licensed dealers from selling armor-piercing ammunition to individuals. 18 U.S.C. § 922(a)(7)-(8), (b)(5).

Most prohibitions of “armor piercing” ammunition define that category by focusing on the bullet’s material composition. Ordinary ammunition uses bullets made of lead and copper, while laws regulating armor-piercing ammunition typically restrict the use of very dense metals such as brass, steel, or tungsten. The bullets that were later dubbed “cop-killer” were actually invented by law enforcement and known as KTW bullets, based on the initials of the inventors: Dr. Paul Kopsch and two police officers named Turcus and Ward. The KTW’s purpose was and is to shoot through automobile doors or similar targets. *See* David Kopel, *The Return of a Legislative Legend*, Nat’l Rev. Online, Mar. 1, 2004.

The armor-penetrating ability of ammunition depends greatly upon the velocity of the bullet, not just the bullet’s composition. A bullet fired from a rifle will have much higher velocity than the same bullet fired from a handgun, because the rifle has a much longer barrel. Thus, as a practical matter, virtually all rifle ammunition introduced within the last hundred years that is suitable for hunting deer or larger game will penetrate soft body armor (which is typically made of a flexible fabric called Kevlar), regardless of the composition of its bullets.

Hard body armor comprises rigid steel, ceramic, or ultra-high-molecular-weight polyethylene (UHNWPE) plates that can stop rifle fire, but such armor is much heavier and more cumbersome than soft body armor. American soldiers going into combat often wear hard body armor, and police officers on special combat teams do also; for ordinary daily police work, soft body armor is the norm.

F. Nonfirearm Arms

As the title of this book indicates, it is mainly about firearms. But the right to keep and bear arms, as interpreted by the courts, is not confined to firearms. There are certain to be many cases in the future as to what constitute constitutionally protected “arms.” This Part surveys some categories of nongun arms. For case excerpts and other information on nongun arms, see Chapter 11.E.2.

1. Stun Guns and Tasers

Stun guns have two exposed electrical prongs. The current between the two prongs can temporarily disable a person. To use a stun gun, one must touch the stun gun to the target’s body. A variant of the stun gun commonly used in law enforcement is the *Taser*, which fires darts connected to the main unit by thin insulated copper wires. The darts deliver electric current to disrupt the voluntary control of muscles and can be used against an assailant several feet away. Stun guns and Tasers will not work on an attacker wearing a thick coat.

The Supreme Court in *Caetano v. Massachusetts*, 136 S. Ct. 1027 (2016) (Ch. 11.E.2), reversed a state court decision holding that stun guns are not protected arms under the Second Amendment because they are unusual, were not in common use when the Amendment was enacted, and have no military utility. None of these reasons ruled out Second Amendment protection, the Supreme Court emphasized, because they were inconsistent with *District of Columbia v. Heller*, 554 U.S. 570 (2008) (Ch. 10.A).

Following *Caetano*, the Massachusetts Supreme Judicial Court held in *Ramirez v. Commonwealth*, 94 N.E.3d 809 (Mass. 2018), that the state’s absolute ban on civilian possession of stun guns, even in one’s home, violated the Second Amendment. Likewise, the Supreme Court of Illinois held in *People v. Webb*, 131 N.E.3d 93 (Ill. 2019), that a state statute imposing a complete ban on public carrying of stun guns is unconstitutional under the Second Amendment.

2. Swords, Knives, and Other Edged Weapons

In the nineteenth century, the sword, particularly the short swords wielded by cavalymen, was often listed as among the core type of militia-suitable arms protected by state constitutional guarantees. See Chs. 5, 6. During the colonial period and the early decades of independence, most militia laws (and often laws applying to other persons, such a female head of a house) required ownership of both firearms and edged weapons. These included swords, knives, hatchets, and similar arms. See David B. Kopel & Joseph G.S. Greenlee, *The Second Amendment Rights of Young Adults*, 43 S. Ill. U. L.J. 495 (2019) (listing the mandatory arms and the persons covered by the statutes).

To the generation who fought and won the American Revolution, a paradigmatic arm was the bayonet, a knife made to be attached to the tip of a rifle

or musket. (As discussed *supra* in Section E.1, a musket is a long gun that shoots a single large ball of lead.) At close quarters, the bayonet was a more effective weapon than the firearm, partly because it did not need to be reloaded. Nineteenth-century decisions generally treated swords and knives as being within the scope of the right to arms, although there were sometimes exceptions for knives thought to be used mainly by ruffians or brawlers—such as the Bowie knife. *See* Ch. 5.

Most states have no particular restrictions on purchasing and owning swords or knives, but carrying restrictions may exist, especially on knives, and there may be bans on certain types of knives, especially switchblades and daggers.

Fencing, using sabre, epee, or foil, is a popular sport. History-minded organizations such as [the Academy of European Medieval Martial Arts](#) (based in Toronto, Canada) train people in old-fashioned combat techniques, such as swordsmanship.



Buck Knife, model 482.



Buck Knife, model 730CM X-tract.



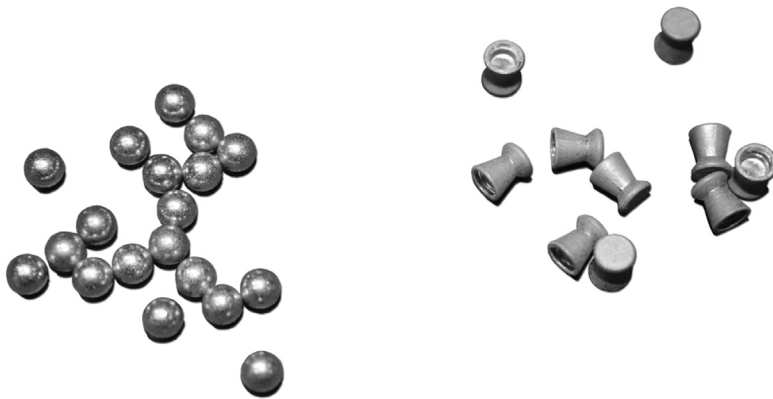
Is a hatchet a Second Amendment arm?

For further information on edged weapons, see David B. Kopel, Clayton E. Cramer & Joseph Edward Olson, *Knives and the Second Amendment*, 47 U. Mich. J.L. Reform 167 (2013), and [Knife Rights](#).

3. Air Guns

Air guns are not “firearms.” Instead of being powered by the burning of gunpowder, they are powered by compressed air or carbon dioxide. The compressed gas is usually stored in a small cylinder that fits in the gun’s grip or stock. The compressed air may also be created by pumping a slide or lever on the gun. The simplest air guns, such as the famous [Daisy Red Ryder](#), shoot a small (.177 caliber) round ball called a *BB*. Other air guns fire a special *pellet*.

Air guns can be rifles or handguns.



BBs and pellets.

Air-gun shooting is an Olympic sport. While having a limited range, the highest-quality air guns can be extremely accurate, more so than even the best firearms.

Air guns are subject to no special controls in most jurisdictions, although some jurisdictions limit unsupervised use by minors. New Jersey regulates air guns the same as firearms (police permission is required for each purchase), and [New York City bans](#) them.

4. Paint Guns

Paint guns are used in the sport of *paintball*. Teams with paint guns shoot at each other in a special field that has various obstacles and places to take cover. Informal matches can also be held in the woods or other natural settings. Paint guns (usually smooth-bore long guns with a relatively short barrel) fire a round paintball, whose caliber is typically from .43 to .68 inches. If a player is hit by a paintball, he must leave the field for the remainder of the match, or for a period of time.

The gun (or “marker,” as players call it) is powered by a large cylinder of compressed air or carbon dioxide attached to the gun and connected to the action via a hose. Markers can be pump action, semi-automatic, or automatic.

Head protection is mandatory, especially for the eyes, and a paintball hit on bare skin can raise a welt. Military training is sometimes conducted with paint guns, allowing simulation of close-quarters combat without a risk of injury or death. The United States Army is a leading sponsor of paintball products and events and works assiduously to enlist paintball competitors. Paintball is an intercollegiate sport.

As with air guns, paint guns in most jurisdictions are subject to no special restrictions, but in a few places are regulated as if they were firearms.

5. Bows

Until well into the sixteenth century in England, the paradigmatic militia arm in England was the *longbow*. In Switzerland, it was the *crossbow*.

Bow hunting (archery) still is popular in the modern United States. Many states have special bow-only hunting seasons. Hunting with a bow is more difficult than hunting with a firearm. In order to make a lethal shot, the bowhunter must get much closer than does a firearm hunter.

Invented in the latter twentieth century, *compound bows*, which use a system of pulleys, predominate in modern hunting. The pulleys allow the bowman to store more mechanical energy with the pull of the bow string. Compound bows are more difficult to draw when the bow string is first pulled but are easier to hold in the fully drawn position. They were originally controversial but are now accepted everywhere that bow hunting is allowed.



A huntress with a Hoyt compound bow, wearing camouflage by Prois Hunting Apparel for Women.

Outside Switzerland, crossbows have always been more controversial, being associated with highwaymen and other criminals. However, a growing number of states now allow crossbow hunting, some for all hunters, others only for older or physically challenged hunters. Unlike vertical bows, the string of some crossbows can be drawn by turning a crank. Other crossbows have a metal loop on their fronts that assists weaker shooters in reloading. The shooter places the loop onto the ground, places his foot into the loop to hold the crossbow down, and then pulls the string back with both arms. Once the string is drawn, it is held in position by a lever until it is released by the pressing of a trigger. These features make crossbows easier to employ by bowhunters lacking upper-body strength. The stock and trigger of a crossbow look much like a firearm, and thereby make the crossbow look more controversial.

For further information, including safety instruction, see [North American Crossbow Federation](#) and [North American Bowhunting Coalition](#).

6. Sprays

Chemical defense sprays have been common in the United States since the late 1960s. Pepper spray is legal in all states, but many states limit the size or strength of the spray. For a summary of state laws on pepper sprays, see <https://www.defensivestrategies.org/self-defense-security-products/pepper-spray-laws>.¹³ Other types of defensive sprays include tear gas and mace.

Many hunters carry a large and especially powerful canister called *bear spray*, which is sometimes more effective than a gunshot at turning away an aggressive bear.

Like any method of self-defense, sprays have particular advantages and disadvantages. Many people prefer a nonlethal means, and the carrying of sprays is allowed in many places where firearms are not. However, sprays tend to be less effective against aggressors who are under the influence of drugs or alcohol, or who consume a diet with lots of hot peppers.

7. Blunt Weapons

Laws about blunt weapons, such as *billie clubs* (also spelled “billy”), are extremely varied, ranging from no controls to prohibition. Like many of the weapons discussed in this section, they are often prohibited from public carry by general laws against carrying dangerous weapons.

13. Precisely speaking, “Mace” is the name of a product invented in 1965, using aerosol as a carrier for tear gas. The product’s popularity led to “mace” becoming a common, but incorrect, term for defensive sprays from other manufacturers. Separately, “mace” is also the name of a spice made from nutmeg coatings, and a heavy medieval war club with a round, spiked, or flanged metal head.

8. Martial Arts Weapons

Most martial arts weapons, such as *nunchaku* or *throwing stars*, were created by the Chinese, Japanese, or Okinawans. They became popular in the United States as part of the surge of interest in all things Chinese, including the martial arts, that followed President Richard Nixon's 1971 opening to China. Most states have no special laws about them, although some states restrict carrying. New York and Massachusetts (and to a lesser degree, California) ban almost all of them.

Nunchaku are a pair of sticks connected by a chain.¹⁴ They were briefly famous in public discourse when Second Circuit Judge Sonia Sotomayor was nominated to the Supreme Court. As a circuit judge, she had been part of a per curiam panel that upheld a New York State ban. See *Maloney v. Cuomo*, 554 F.3d 56 (2d Cir. 2009) (Ch. 11.E.2 Note 6). The decision led some persons to question her commitment to Second Amendment rights. After the Supreme Court decided *McDonald v. Chicago*, it vacated and remanded the nunchaku case. *Maloney v. Rice*, 561 U.S. 1040 (2010) (Ch. 11.E.2 Note 6). Eventually, the ban was declared unconstitutional, because the government had failed to prove that nunchaku are not in common use, and are not typically possessed by law-abiding persons for lawful purposes, *Maloney v. Singas*, 351 F. Supp. 3d 222 (E.D.N.Y. 2018).

The *tonfa* (essentially a billie club with an extra, perpendicular handle) is a popular arm for police use.

9. Brass Knuckles

Brass knuckles and similar devices for the fingers (e.g., rings with fighting spikes) are prohibited in many jurisdictions.

For further information, see Eugene Volokh, *Nonlethal Self-Defense, (Almost Entirely) Nonlethal Weapons, and the Rights to Keep and Bear Arms and Defend Life*, 62 Stan. L. Rev. 199 (2009).

14. "Nunchaku" is the plural and the singular, properly speaking. However, "nunchuks" is used informally. Nunchaku are also called "chuka sticks."

