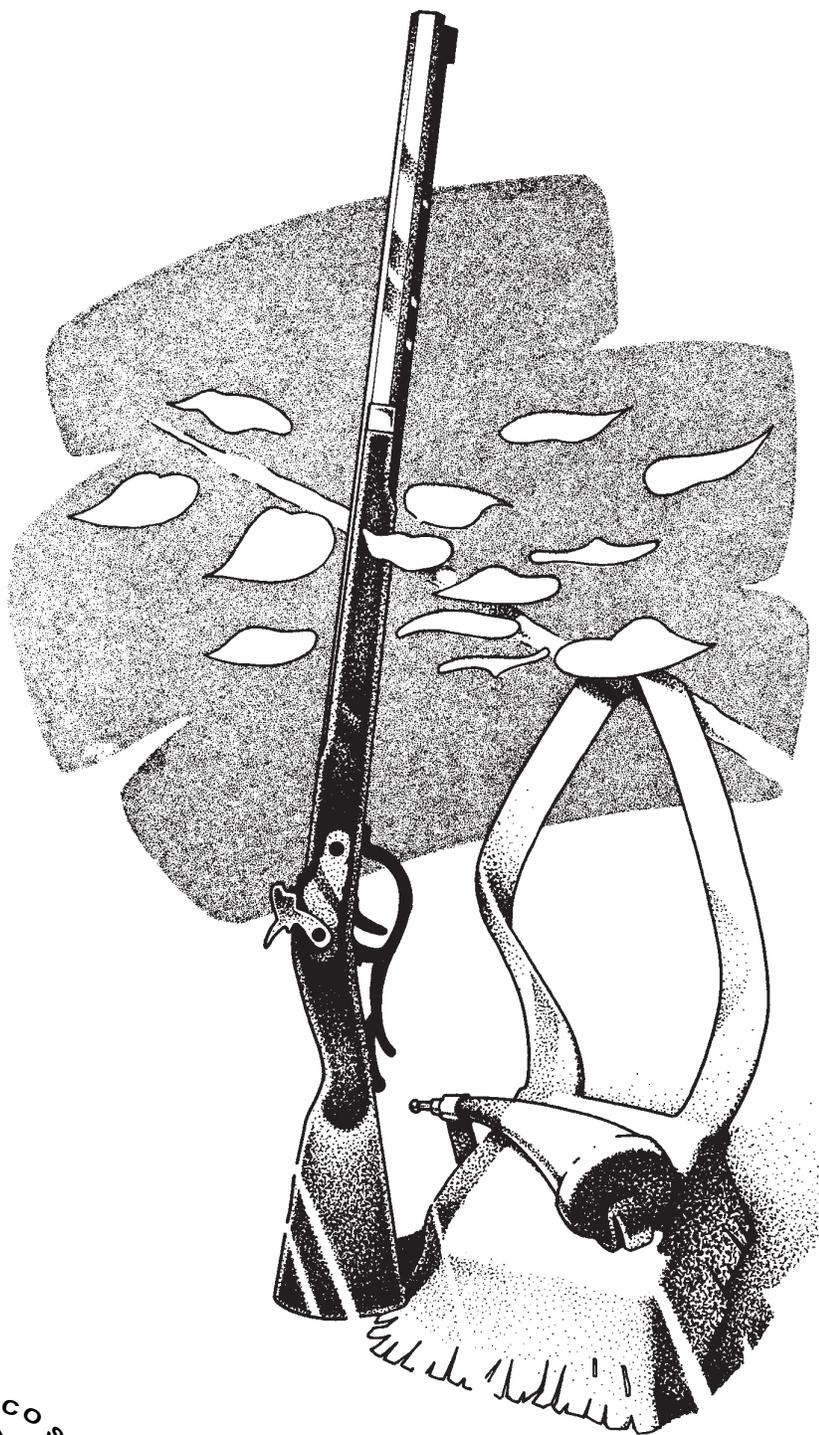


Basics of Muzzleloading



Cooperative Extension Service • Circular 500

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Basics of Muzzleloading

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Have you ever dreamed of returning to the thrilling days of the mountain men? Or of sharing in the adventures of such wilderness heroes as Davy Crockett, Daniel Boone, or Jim Bridger? Many people are attempting to experience a part of those days through black powder or muzzleloader shooting. The rifles that these modern mountain men use are replicas of the weapons used by the original frontiersmen. Not only are black powder weapons just plain fun to shoot, but the muzzle-loading rifle is an effective hunting weapon. Many states, including New Mexico, have established special seasons for hunters using muzzleloaders, and this has increased the popularity of the weapon.

This publication is meant as a guide for those just starting out as black powder shooters, but it may also serve as a reference for more accomplished muzzleloader enthusiasts.

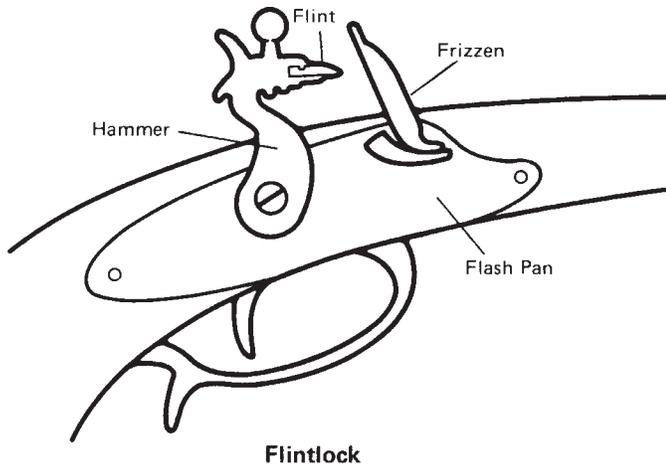
If you encounter terms in this guide with which you are not familiar, refer to the glossary at the end of the text.

TYPES OF RIFLES

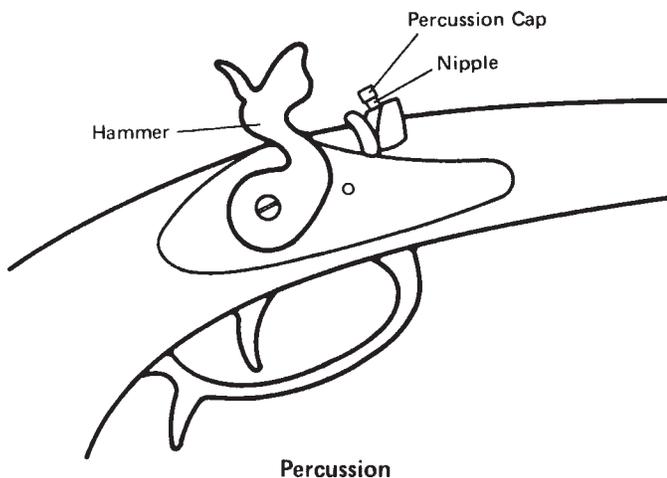
Many types of black powder weapons are commercially available. One can shoot muzzleloading rifles, muskets, pistols, and even shotguns. Because they are most popular, this guide will focus on percussion and flintlock rifles.

Both the percussion and flintlock rifles are fired when the powder in the breech is ignited. The manner in which this powder is ignited gives the two rifles their names.

Late in the 16th century, the FLINTLOCK came into prominence. On this rifle, a piece of flint is clamped onto the hammer. When the trigger is pulled, this piece of flint strikes the hinged cover of the pan, spraying sparks into the priming powder, which ignites the powder in the breech.



In the early 1800s, the PERCUSSION rifle was developed. It requires no flint and no priming powder. Instead, a “percussion cap” is placed on a hollow cone. The opening on this cone, or “nipple,” leads to the powder in the breech. The percussion cap contains the priming compound, which ignites the powder in the breech. When the trigger is pulled, the hammer strikes the cap, causing the priming compound to explode, which in turn ignites the powder in the breech.



When you decide to buy a black powder rifle, you must decide if you want a factory-built replica, build-it-yourself replica, or a more costly original.

The most inexpensive route is one of the many muzzleloader kits available. The only requirements are a few basic tools, a minimum amount of woodworking skill, a little patience, and a lot of time. Building your own rifle provides self-satisfaction and can result in a higher quality muzzleloader than can be bought readymade.

If you do not possess the requirements necessary to build a black powder rifle, a large selection of replicas is available in various styles and price ranges. Most manufactured by established companies are well made and come with impressive guarantees. Shop around, and, if possible, seek assistance from a knowledgeable friend before purchasing your rifle.

If you are a real traditionalist, you may want to buy an original. These are effective weapons, but they are generally considered too valuable to be used in competition or for hunting.

If you are considering using an original, you should first have it inspected by an expert. Examine the breech area for rust or deterioration. The lock mechanism should be checked for safety function. If the gun has a Damascus barrel, retire it to a place of honor but do not attempt to shoot it. These barrels were formed by welding strips of steel together. The welds are susceptible to corrosion from black powder, and many of the barrels are unsafe.

There are many models of black powder rifles. Some of the models are the Brown Bess, the flintlock that was the official arm of the British troops; various reproductions of the Kentucky and Pennsylvania rifles; the Zouave rifles of the 1863 period; the Springfields of the Civil War period; the Hawkin rifle favored by the Rocky Mountain trapper; and many more.

Before you invest in a muzzleloader, consider your anticipated needs. A firearm meant for display should be chosen differently than one meant for target shooting. Muzzleloaders intended primarily for display are chosen according to the taste of the owner. Target black powder weapons should be selected after you have attended several shoots and talked to participants. The most accurate weapons often lack style and bear little resemblance to originals.

If your muzzleloader is to be used for hunting, give careful consideration to the caliber, weight, sights, and handling. Most states have specific regulations covering the caliber required to hunt big game species. Other considerations vary with the preference of each shooter, but generally a muzzleloader selected for hunting has many of the characteristics of modern smokeless powder firearms.

POWDER

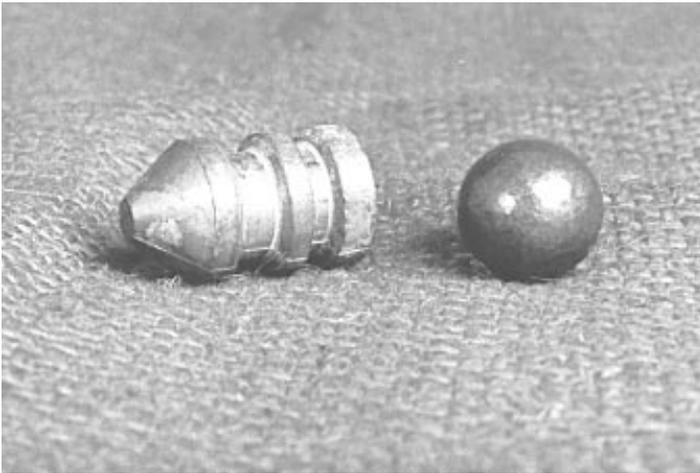
Black powder comes in four types, based on the size of the particles. FFFFg is the finest, with FFFg, FFg, and Fg being respectively coarser. FFFFg is only used in the flash pans of flintlocks. The other types are used as the breech charge according to the manufacturers' instructions. Normally, the larger the caliber, the coarser the powder.

A relatively new propellant, known as Pyrodex, is available that reduces fouling and corrosion associated with black powder shooting. Many shooters feel it is necessary to use a "hotter" cap to reduce the chance of hangfires or misfires sometimes associated with Pyrodex.

BULLET OR BALL

Round lead balls used with a cloth patch are the traditional projectile used in muzzleloaders. The conical slug, a popular bullet-shaped projectile, is also available. One advantage of the conical slug is the ease with which it can be seated, even in a rifle with a dirty bore. There is disagreement among muzzleloading enthusiasts as to which type of projectile is most accurate. The majority of experts feel the most accurate projectile can differ between rifles—even those from the same manufacturer.

The conical slug is normally heavier than a round ball in the same caliber. For this reason, many hunters prefer the larger mass of the slug. Loading is also faster than with a round ball because no patch is used.



EQUIPMENT

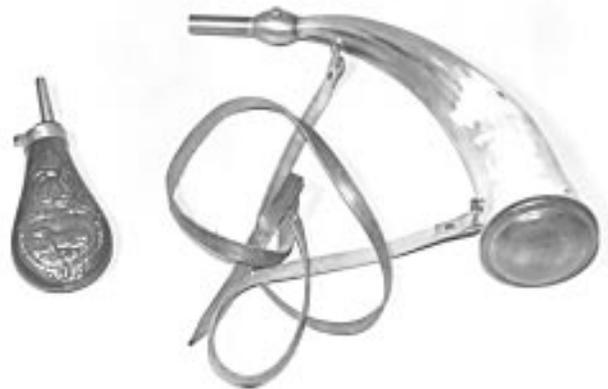
A variety of associated equipment is available for the muzzleloader. Much of this equipment is for convenience or safety, but some of it is necessary before you even fire the weapon.

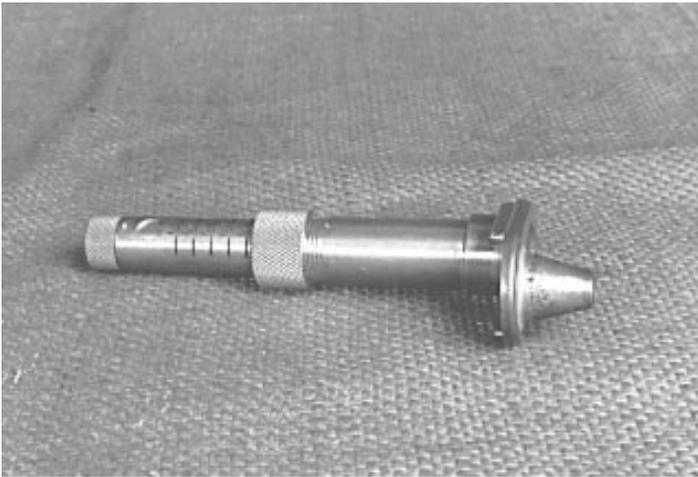
If you are going to use round balls, you need patch material. The patch is lubricated and wrapped around the ball to form a tight fit and seal the barrel so gases cannot escape around it.

The lubricant is necessary to ensure a seal and also to facilitate seating. The lubricant can be saliva, shortening, or one of the commercially available lubricants. It is generally agreed that saliva evaporates, thus rendering the "spit patch" less effective as a gas sealant.

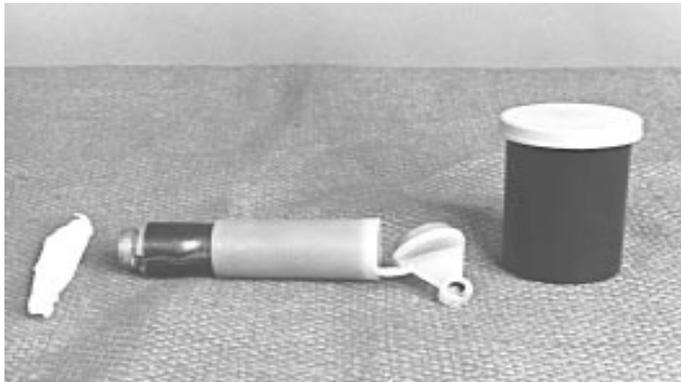


Many black powder shooters carry a powder horn or flask. These are made of a variety of spark-proof materials that range from authentic steer horn to plastic reproductions. The powder horn functions as a safe way to carry a quantity of black powder that can be transferred to the powder measure.

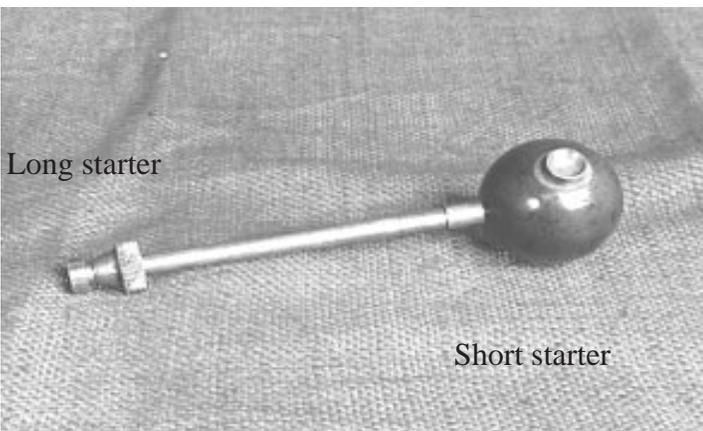




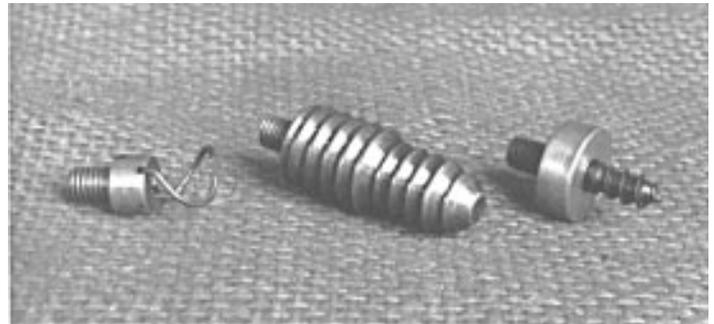
The “powder measure” is an adjustable brass tube used to determine the exact powder charge. Many ingenious black powder hunters have devised ways of eliminating this cumbersome and time-consuming step when loading in the field. Often, a pre-measured charge is carried in a pill box, film canister, or paper or plastic tube. Some quick loading gadgets are commercially made that hold the powder, primer, and projectile.



A bullet starter is another important item. This is an instrument used to press the bullet into the muzzle. The “short starter” is used to force the bullet the first one-fourth inch. Then, the “long starter” gets it further down the muzzle. The ramrod is then used to push the bullet down to the bottom of the barrel.

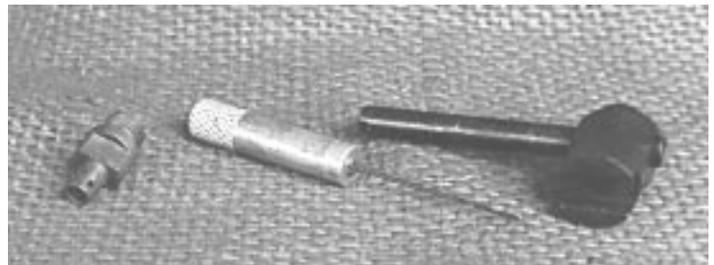


Several devices screw into the threaded end of the ramrod. A “worm” is a corkscrew item used to entangle and retrieve patches stuck in the bore. A “ball screw” is a handy item used to remove a ball when the barrel must be cleared without firing. A jag is a device the size of the bore that holds the cleaning patches.



Worm Jag Ball screw

Other items found in a muzzleloader’s “possibles bag” include a nipple prick, used to clear the nipple or flashhole; a nipple wrench, to remove the nipple; and a patch box, to hold prelubricated patches.



Nipple Nipple Prick Nipple wrench

LOADING

Before loading, several precautions must be taken to ensure the weapon is safe and in working order. Consistency and accuracy are prime concerns. Because of the primitive nature of black powder rifles, misfires are frequent if the precautions are not taken.

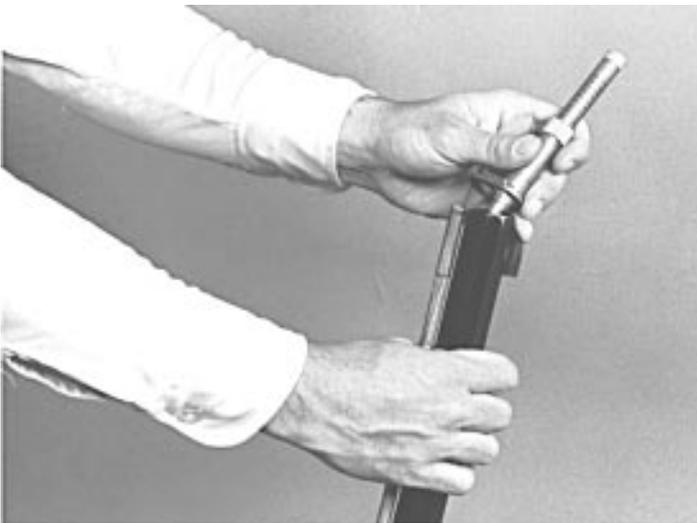
Wipe the barrel clean with a patch and be sure the nipple, or flashhole, is clear. Any oil or moisture may prevent the powder from igniting. Before loading a flintlock, prime the flash pan and touch off, being sure to point the rifle in a safe direction. Before loading the caplock, fire three or four caps to be sure the breech is dry. Again, be sure the muzzle is pointed in a safe direction.

There are five steps to loading black powder rifles. If you always follow these steps, misfires and hangfires (delayed ignition) will be minimized, and the accuracy and dependability of your black powder rifle will be maximized.

1. Put the hammer at half-cock. This prevents air from being trapped in the breech. Check to be sure no caps or priming powder are present.



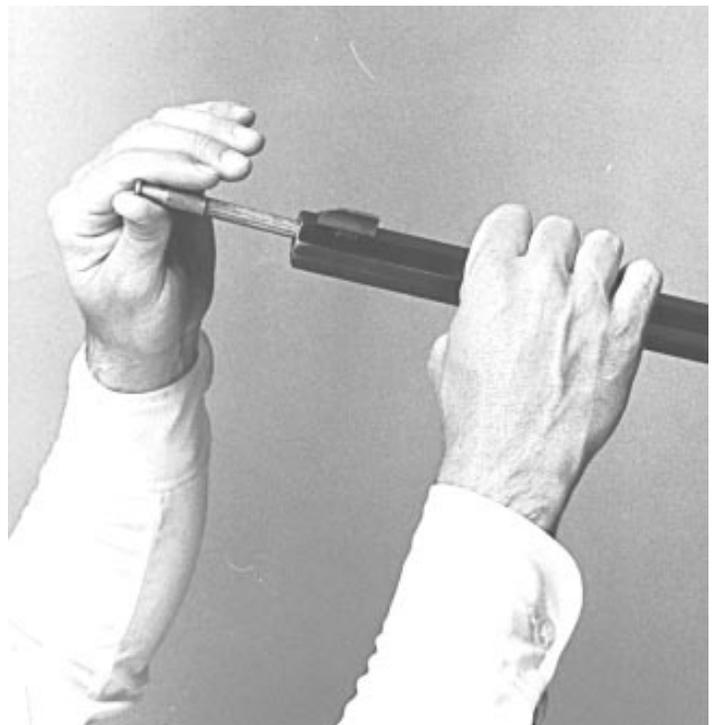
2. Pour a measured amount of powder into the barrel. Do not pour directly from the powder flask. Follow the manufacturer's recommendations for charge amounts. Always keep the muzzle pointed away from your face when pouring the charge down the barrel. Tap the barrel a few times to settle the powder charge.



3. To seat the bullet, place a lubricated patch over the muzzle and center a bullet on it. Using the short starter, apply steady pressure to start the bullet down the muzzle. Except for the patch, the same procedure is used to start a conical slug.



4. Use the long starter to push the ball deeper and the ramrod to seat it firmly against the powder charge. There should be no space between the bullet and powder charge. Some shooters put a mark on the part of the ramrod sticking out of the barrel so they can tell at a glance that the ball is completely seated. To ensure consistency between shots, apply the same amount of pressure to the seated ball every time you load. This pressure determines how tightly the powder charge is packed and can influence the ignition rate.



5. Place a percussion cap on the nipple or prime the flash pan with FFFFG powder. If your cap does not fit snugly, pinch both sides slightly so it will not fall off the nipple. The gun is now ready to fire.



CLEANING

Because black powder is very corrosive, clean the barrel out with hot soapy water or commercial cleaner before storing it for the day. Thoroughly dry the rifle and apply a light coat of oil.

Some shooters give the barrel a quick cleaning after every few shots. This makes loading easier and improves the consistency of the shots.

SAFETY

The same safety considerations applied to modern cartridge firearms are also applied to muzzleloaders. You should be aware of a few additional precautions.

Never use smokeless powder in a black powder weapon. To do so could result in serious injury to the shooter.

Black powder is highly explosive. Keep it away from even the smallest spark. Pay special attention to keeping it away from campfires and smokers.

Be sure the ball is firmly seated against the powder charge. A ball lodged partway down the barrel can allow dangerous pressures to build.

When pouring powder into the barrel, be sure to hold the muzzle away from your face. Smoldering residue remaining from a previous shot could ignite the new charge and cause serious injury if the muzzle is not

pointed in a safe direction.

Never load a black powder weapon until you are certain there is no cap on the nipple or charge in the flash pan. Failure to do this has resulted in more black powder mishaps than any other cause.

Follow the safety precautions that apply to all firearms. Modern black powder weapons are safe and effective, but only when used properly.

GLOSSARY

Ball - Round lead projectile used most commonly in the majority of muzzleloading rifles and nearly all black powder pistols and cap and ball revolvers.

Ball screw - Resembling a wood screw, this attachment threads into the end of the ramrod and is used for removing the ball from the bore. The threaded point of the ball screw digs into the soft lead of the ball and grips it firmly enough so that it can be pulled through the length of the barrel.

Black powder - A mixture of potassium nitrate, charcoal, and sulphur. Combined, these ingredients form the standard propellant for muzzleloading guns.

Bore build-up - The build-up of black powder fouling in the barrel after shooting.

Breech - The rear end of a muzzleloader's barrel.

Breech plug - The threaded plug that is screwed into the breech end of a muzzleloader's barrel. This forms a gas-tight seal and is actually the rear or bottom of the chamber.

Cap box - Normally appears as a hinged compartment on the buttstock of a rifle or shotgun. The cap box is exactly as the name suggests, a place to carry caps.

Caplock - A term often used to describe a percussion lock.

Charger - A term used to describe anything—flask, horn, dipper, etc.—that measures out one exact charge of powder.

Damascus barrels - Early barrels formed by welding together strips of various steels.

Flash - The result of the ignition of the priming powder in the flash pan when a flintlock is fired.

Flashhole - The hole leading from the pan of a flintlock to the powder charge in the chamber.

Flash pan - Small pan that holds the priming charge and is located below the frizzen or striking arm on a flintlock.

Frizzen - The hardened steel surface that the flint strikes to ignite the primed flash pan of a flintlock.

Fulminate of mercury - An explosive priming charge used in the making of percussion caps.

Hangfire - A dangerous situation that occurs when what appears to be a misfire discharges after a short delay.

Jag - An accessory that fits into the end of the ramrod to aid in cleaning the barrel. Usually has serrated edges to grip a cleaning patch.

Loading block - A wooden block that has been drilled with holes for carrying pre-patched balls. To use, the hole in the block is aligned with the muzzle, and with a short starter the ball is seated into the muzzle.

Minie ball - An aerodynamically stable cylindrical conical slug with a hollow base. The same type bullet with a solid base is referred to as a maxi-ball.

Misfire - Situation that occurs when the round loaded in the chamber fails to fire, even when the cap or priming powder goes off.

Nipple - The small metal cone that the percussion cap is fitted to. Flame from the exploding cap is passed through the nipple to the main charge of powder loaded in the chamber.

Nipple wrench - a tool used for replacing or removing a nipple from percussion guns.

Patch box - An inlaid lidded box that is found on some of the muzzleloading rifles, originally intended for carrying greased patches.

Patching - Cloth, usually cotton or linen, used to form a gas tight seal around the round ball loaded into a muzzleloading rifle.

Percussion cap - A small metallic cup containing a minute charge of fulminate of mercury. When placed on

a nipple, the striking of the hammer causes the fulminating charge to explode, which in turn ignites the powder in the chamber.

Possibles bag - Container used by the mountain man and trapper to carry many black powder accessories.

Powder flask - Carrying container for powder, commonly made of metal with characteristics of copper and brass. Occasionally made from stag horn or like materials.

Powder measure - A graduated measuring device that can be adjusted to measure out different grain loads.

Pricker or vent prick - A piece of fine wire used to clear the nipple or flashhole of fouling or obstructions.

Ramrod - Usually made of wood, although brass and fiberglass are not uncommon. Used to seat the ball over the powder charge in muzzleloading rifles. Ramrods are commonly carried under the barrel, held by ramrod thimbles.

Set trigger - A double trigger mechanism in which the rear trigger is first pulled to set up the front trigger so that it can be released with very slight pressure.

Shot pouch - A container, most often made of leather, used for carrying shot.

Short and long starter - A short, five- to six-inch rod with a round or flat palm-fitting handle. Used for starting patched balls down the muzzle of rifles.

Tang - Most often an extension from the breech plug that is the retainer that holds the breech portion of the barrel securely in place.

Vent - The small hole running from nipple to breech plug on caplocks, through which the priming flame travels to ignite the powder charge.

Worm - A corkscrew type of device used to remove a cleaning patch stuck in the bore of a muzzleloading rifle. It usually screws into the threaded tip of the ramrod.

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