

Make Ready, Present, Fire (Sometimes)

Herman Karl, Armorer and Quartermaster of Muskets

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In anticipation of the resounding "boom" when commanded to "fire" all of us have experienced only the "flash in the pan" or no flash at all. Four conditions are critical to help insure the main charge will ignite: 1) a properly hardened and clean frizzen, 2) a sharp and tight flint, 3) a properly located and clean touchhole, and 4) a properly primed pan.

1) Properly hardened and clean frizzen

Shards of red-hot steel scraped off the frizzen (also called the steel and hammer) by the flint ignite the priming charge. If the frizzen is too soft, not being properly hardened, it will not "spark" and the flint will only gouge out bits of "cool" steel. If the frizzen is dirty with powder residue or oil, it will not spark. You can test the hardness of the frizzen with a file. If a file easy cuts the face of the frizzen, it is too soft and you should have it rehardened by a competent gunsmith. Whereas the face of the frizzen needs to be hard, the neck where it attaches to the lock needs to be ductile so that it will not break. Keep the frizzen clean by wiping it frequently; if particularly dirty, alcohol is an effective cleaner. It's a good idea to carry a small piece of emery cloth and use it to clean periodically the frizzen. It helps to "freshen" the face and can improve sparking.

2) Sharp and tight flint

!!!Before fitting the flint make sure there is no charge in the bore and the pan!!!

A. Select the correct size for your lock.

B. Wrap a piece of leather or sheet lead around the flint. Cut a small oblong opening in the back of the leather/lead so that the back of the flint can rest against the frizzen screw. Doing this helps prevent the flint from "giving" by being cushioned by the leather/lead when it strikes the frizzen. You want the leather/lead to act as a cushion on the top and bottom of the flint so that it is secured better between the jaws and does not fracture when they are tightened. However, to help get the best spark as much energy as possible should be transferred from the cock/flint to the frizzen.¹

C. When fitting the flint, close the frizzen and let the cock forward so that the flint rests against the frizzen. The flint is loose in the cock so that it can be adjusted. I hold the frizzen against the flint when adjusting. Move the flint so that the edge is square to the face of the frizzen and extends across the entire width of the frizzen. Tighten the cock screw. Cock and fire the musket a couple of times to test for spark. You might try the flint both bevel up and bevel down. Sometimes that will make a difference in sparking. If

¹ A tip to prevent losing the leather in the heat of battle is to punch a hole through it large enough to fit the top jaw screw (the screw that tightens the jaw against the frizzen. Take the screw out and run it through the hole; retighten the jaw. This way the leather will not come out with the flint when changing flints.

you are getting full contact and good sparks, retighten the cock screw. You should check for tightness every 10 shots or so.

D. Make sure your flint and frizzen are clean and dry. Wipe both often when shooting.

E. If you do not get good sparks with a sharp flint, the frizzen probably needs to be rehardened.

Appendix A describes how to knap the frizzen when it is in the cock. At the end of the appendix is the url for a short video showing how to use a knapping hammer. Sometimes all you need to do is chip or flake off a few small pieces at the edge to renew its sharpness. When the edge of the flint gets so close to the cock jaws that the frizzen is no longer opening fully, it's time to put in a new flint.

!!!Again before knapping make sure there is no charge in the bore or pan!!!
!!!And put hammer stall on frizzen (hammer)!!!

Obviously you should practice these techniques before you attempt knapping your flint in the field. If you are uncomfortable dressing the flint by knapping, when your flint dulls put in a new one. Always carry spares in the field.

3) Properly located and clean touchhole

The *heat* generated by the priming charge ignites the main charge. The location of the touchhole influences the efficient transfer of heat from the pan to the main charge and, thus, affects the speed of ignition. The illustrations show properly and improperly located touchholes. The touchhole should be located above the bottom of the pan as shown in the photo of the rifle with the stainless steel insert. The touchhole of a Company Charleville musket is located slightly below the bottom of the pan. This location is highly inefficient for positive and rapid ignition. A stainless steel vent liner (the insert through which the touchhole is drilled) provides two advantages. First, the interior of the liner is concave, which brings the main charge closer to the pan promoting quicker ignition. Second, the stainless steel will better resist the erosive and corrosive effects of many firings.



Properly located touchhole



Improperly located touchhole

Keep the touchhole clear cleaning it frequently with a pick. Also, clean the pan of scale and debris with a small brush or cloth.

4) Properly primed pan

Many of us tend to over charge the pan with priming powder. Doing so is especially common during the "heat of battle." As discussed below, only a few grains are necessary to properly prime the pan. Overcharging is not only inefficient for good ignition but also

a potential safety hazard as powder could overflow the pan. Keep in mind it is not a "powder train" leading from the priming pan through the touchhole to the main charge that ignites the main charge. It is the heat generated by the priming charge. For efficient ignition, the touchhole must be clear, which includes being clear of powder.

From *Marksmanship in 1775: Myth or Reality* by Alexander Rose, *American Rifleman*, July 2010, p. 47:

" On March 21 [1775], Litchfield [a MA militiaman] fine-tuned the amount of gunpowder he needed to be effective at 100 yds. by spending the whole day 'cleaning the lock and fixing her. After I had cleaned and oiled the lock I put in a good flint and tried her to burn three corns [grains] of powder. I cocked her and snapped and she burned them. I told out just three corns and tried her again and she burned it so I tried her eleven times successfully and she burnt three corns of powder every time and did not miss. The 12th time she missed them but I overhauled and cocked and she burnt them the next time."

How Litchfield measured three grains is not specified. However, he must have determined this to be the optimum priming charge and used a measure. Three grains by the way is what many priming flasks today are calibrated to throw with FFFFG, the granulation used for priming today. The attached photo shows what 3 grains of FFG (the granulation LMM uses for priming) looks like in the pan of my 1730 Pattern Long Land Service musket.

Also, there is a debate in muzzleloading circles whether the priming charge is more efficient banked away from the touchhole. It is the heat of the powder gases that ignites the main charge.



Three grains of FFG in a Brown Bess pan

Following the above steps should help ensure positive and rapid ignition of the main charge in your musket resulting in the loud "boom" upon squeezing the trigger.

Appendix A

Flints and Knapping a New Edge

by Charlie Maggard, Muzzle Blasts Online v. 4, number 1

A sharp flint is absolutely paramount for good performance from your flintlock. The fastest lock time cannot compensate for a dull flint. Once, during a match, I observed a fellow shooter struggling to get his flintlock to fire. He finally resorted to knapping the edge of his flint. I watched as precious time was evaporating from his match relay clock. He was using the little hammer and rod method that we all have seen many times. I offered to show him an easier and faster method, but he was convinced his method was the only way to properly knap the flint edge. He ran out of time before he finished shooting. This method works, but it is extremely slow.

I'm always looking for an easier or better method to do things. About twenty-five years ago a friend showed me a simple and quick method to knap a dull flint edge. His knapping tool was a piece of brass rod 3/4" in diameter by two inches long - nothing fancy, just a piece of scrap brass. He made me a gift of this tool and I still carry it in my possibles bag.

To use the tool, the hammer of the lock is placed at half cock with the frizzen open and the pan empty of priming powder. The piece of brass is held at a slight angle to the face of the flint. Hit the cutting edge of the flint with a sharp rap from the piece of brass. The bottom of the flint face will flake off, leaving a sharp new cutting edge. Two or three sharp raps may be necessary for a clean, sharp edge. You will have a sharp flint in a few seconds - faster than you can find your little hammer and rod.

A word of caution: NEVER, NEVER test the sparking of a new or sharpened flint on a loaded gun, even if there is no prime in the pan. More than once I have seen rifles go off when a spark hits the touch hole.

Use only brass or bronze, in order to prevent sparks. Aluminum is too light to be effective, and steel could produce sparks. The brass doesn't have to be 3/4" in diameter, and it doesn't have to be round. Any diameter from 5/8" to 1" square, round, or rectangular will work fine. Some sources for brass stock are scrap metal dealers, tool supply companies, knifemaking suppliers, and plumbers. I have several old brass valve stems that were salvaged from a plumber's junk box. Brass is cheap and available almost everywhere. I keep a few of these little brass pieces with me and have made many new friends by giving them one and showing them how to use it. The piece of brass fits very nicely in your possibles bag or shooting box and can be found quickly.

Some people have never learned how to knap the edge of a flint and just throw away the dull flint and replace it. Years ago when flints were twenty cents each this may have been

O.K., but today the cost of a good English flint is a dollar or more. Learn to knap the edge on your dull flints and get your dollar's worth.

Knapping with a hammer

http://www.ehow.com/video_5112991_knap-flint-muzzleloader.html