The development of Firearms

HAND GONNE

The earliest ‘hand gonne’ was developed in the fifteenth century, but was not a great influence in battle. It was a small cannon with a touch-hole for ignition. It was unsteady, required that the user prop it on a stand, brace it with one hand against his chest and use his other hand to touch a lighted match to the touch-hole, and had an effective range of only about thirty to forty yards. It surely must have taken iron nerves to use one of these against a charging knight, nearly within his lance’s reach, when the powder might not even ignite.

FLASH PAN

Users of primitive cannons and ‘hand gonnes’ came to realize that a more reliable ignition system was needed. It was just too difficult to use one hand to touch a lit match to an open hole in the gun barrel in the heat of battle while trying to hold the gun steady with the other hand. Also, there was often not enough gunpowder exposed at the touch-hole to ignite reliably. So, the gun designers had to come up with a more reliable system to get the gunpowder lit in a hurry.

Eventually, a clever invention was devised to solve the problem. The touch hole was moved to the side of the gun barrel, and a cup was placed at the opening with a lid on it. This cup would hold a small amount of gunpowder which could be easily ignited. When the powder began to burn, some of the fire would go through the touch hole and ignite the gunpowder inside the barrel, thereby firing the gun. This cup was called the "Flash Pan". The cover on the flash pan prevented the powder from blowing away in the wind or from getting wet in a fog. The above animation shows a top view of a gun barrel with flash pan.

All the later ignition systems on guns with a flash pan were designed to automatically ignite the gunpowder in the flash pan at the press of a lever or trigger. This was accomplished by either putting the end of a burning wick into the flash pan or using a flint and steel combination to throw sparks into the flash pan.
MATCHLOCK

The Matchlock was a welcome improvement in the mid-fifteenth century and remained in use even into the early 1700s, when it was much cheaper to mass produce than the better classes of firearms with more sophisticated ignition systems. The Matchlock secured a lighted wick in a moveable arm which, when the trigger was depressed, was brought down against the flash pan to ignite the powder. This allowed the musketeer to keep both hands on the gun, improving his aim drastically. The gun had its weaknesses, though. It took time to ignite the end of the wick, which left the musketeer useless in case of a surprise attack. Also, it was difficult to keep the wick burning in damp weather. For the most part, longbowmen were more effective in battle than the musketeers. The one real advantage the musketeers possessed was the intimidation factor which their weapons provided. The first important use of musketeers was in 1530 when Francis I organized units of arquebusiers or matchlock musketeers in the French army.

By 1540 the matchlock design was improved to include a cover plate over the flash pan which automatically retracted as the trigger was pressed.

The matchlock was the primary firearm used in the conquering of the New World. In time, the Native Americans (Indians) discovered the weaknesses of this form of ignition and learned to take advantage of them. Even Henry Hudson was defeated by an Indian surprise attack in 1609 due to unlit matches. The matchlock was introduced by Portuguese traders to Eastern countries around 1498, particularly India and Japan, and was used by them well into the 19th century.

WHEEL LOCK

The Wheel Lock was the next step in firearms evolution. It is said to have been invented by Johann Kiefuss of Nuremberg in 1517, and the idea probably came from the spring driven tinder lighter in use at the time. The idea of this mechanism is simple. Have you ever used a modern lighter which has a flint pressed up against a roughened metal wheel? When you spin the wheel with your finger, the flint pressed against its surface throws off sparks. The same system was used in these firearms to create sparks as needed to ignite the gunpowder to fire the gun. No more waiting to get a wick lit, and no more stressing about it going out when the fog rolls in.
In 1530, Charles V, the Holy Roman Emperor who ruled over Spain and Austria, imported the brothers Marquarte to transfer their workshops from Augsburg to Madrid. They brought to Spain unsurpassed knowledge of firearms production.

The wheel lock design was eventually improved with more durable springs, their main weak point, and a cover over the wheel mechanism to protect it and keep it dry. The wheel lock was an expensive gun to make and a matchlock cost less than half as much, so it was impossible to equip a complete army with the more costly mechanism. Only a person of substantial wealth could afford one for himself.

By around 1560 German gunsmiths were using wooden stocks and adorning them with inlays of ivory and horn. At about this time the metal parts were fire-blued to add extra beauty and to protect against corrosion. Also, metallurgy had improved to the point that gun barrels were no longer bursting very often. The strongest barrels were of damascene manufacture. In this process, strips of metal about the thickness of a man's finger are wound together. Then, another strip is wound around them for the full length of the piece, then the whole thing is heated and welded. It is hammered and forged into the final shape, then bored out. The damascene barrel was the only one that could survive being packed for its full length with gunpowder then fired. Other gun barrels were at risk with only a quarter of their length packed.

SNAPHAUNCE

The Snaphaunce first appeared around 1570, and was really an early form of the Flintlock. This mechanism worked by attaching the flint to a spring-loaded arm. When the trigger is pressed, the cover slides off the flash pan, then the arm snaps forward striking the flint against a metal plate over the flash pan and hopefully produces enough sparks to ignite the powder. This mechanism was much simpler and less expensive than the Wheel Lock. The German gunsmiths, who tended to ignore the technical advances of other nationalities, continued to produce and improve upon the wheel lock up until the early 18th century.
The Flintlock was developed in France around 1612. A key contributor to this development was Marin le Bourgeois who was assigned to the Louvre gun shops by King Henri IV of France. The Flintlock’s manufacture slowly spread throughout Europe, and by the second half of the century it became more popular than the Wheel Lock and Snaphaunce. The main difference between the Flintlock and Snaphaunce is that in the Flintlock the striking surface and flashpan cover are all one piece, where in the Snaphaunce they are separate mechanisms. This made the mechanism even simpler, less expensive, and more reliable than its predecessor. This simplicity allowed for more creative gun designs, such as guns with multiple barrels and miniature pistols which could be concealed easily inside a garment. By 1664 experiments with rotating-block repeated fire guns were under way (like a revolver which holds a number of shots in a rotating cylinder) but such weapons were dangerous to operate and would have to wait for another century and a half to be made a standard weapon.

The northern Arabs acquired the Snaphaunce and Flintlock in the late 1600s and often designed their long guns with a sharply curving butt so that they could be tucked under an arm and fired single-handed from the back of a camel or horse.

In the early 1700s the Brown Bess Flintlock made its appearance. It probably got its name from the acid-brown treatment of its barrel. I mention this so that any flintlock owners with those brown-treated guns (like mine!) will understand just how late in the game they appeared. By this time, the flintlock was accurate up to about 80 yards but nobody could aim at a man and kill him at 200 yards. A shooter of average experience could load and fire two to three rounds per minute.

This information is taken from an article by Lord Alfonso del Corazon Negro. From the site: http://www.silcom.com/~vikman/isles/scraptorium/firearm/firearm.html
(On the site the illustrations are animated to show the action of the locks.)
Musketeer of the Prince of Orange’s Regiments, 1607 (with Matchlock Musket, Match, Charge Bandolier, Priming Flask, Musket Fork, Rapier)

(Matchlock) Musketeer Bandolier
(Replica from an original at the Rüstkammer Emden) Made of vegetable tanned cow leather with felt pad

13 Powder Charges (bottles), attached with twisted leather strips

Priming Flask with spring valve and spout

small Oil Flask of brass

Bullet Pouch of soft leather for appr. 10 bullets and cleaning rag

Hemp Match of 8 mm diameter
Early Arquebus, (before flash pans or match holders)

Matchlock Arquebus (or Harquebus), 1580

Matchlock Petronel (Carbine), French, 1570-80

Matchlock Musket, 1607

Wheel-lock Musket, 1634
Wheel-lock Carbine, Austrian, 1590 (for the lifeguard of the Archbishop of Salzburg)

Wheel-Lock Pistol, Dutch

Flintlock Pistol, Italian, 1768

Flintlock Duckfoot Pistol

Flintlock Blunderbuss, English