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# 10 Innovations That Led to the Modern Bullet

by William Harris

## 7 Fulminate of Mercury/Percussion Cap



In this picture, you can see the hammer, the raised piece of the weapon, which would slam into the cap sitting on top of a nipple or anvil. iStockphoto/Thinkstock

Like The Boss belted out in "Dancing in the Dark": "You can't start a fire, you can't start a fire without a spark." Although Springsteen was referring to romance, the same idea applies to bullets. For a weapon to work, there must be a spark or ember to ignite the primer, which in turn ignites the black powder. [Flintlock pistols and rifles](#) accomplished this by striking a piece of flint against a serrated piece of steel. Sparks from the flint striking the steel fell into the pan containing primer. The primer burned in a rapid flash, thereby lighting the powder charge.

Flintlock weapons worked well, but they had a disadvantage: the delay between the cock falling and the gun firing. A few inventors wondered if fulminating salts, which exploded on impact, might be a better alternative. Unfortunately, the salts were very sensitive to shock, friction and sparks, making them too unstable to be practical. Then, in 1800, the English chemist Edward Howard managed to isolate mercury fulminate, a relatively stable version of the compound. When the Rev. Alexander Forsyth mixed mercury fulminate with potassium chlorate, he produced a very reliable and safe priming agent. By the 1820s, this new primer was the key ingredient in the **percussion cap**, a small copper "top hat" that sat on an anvil or nipple. When the hammer struck the cap, it ignited the mercury fulminate, causing a **flame** to enter the barrel and initiate combustion of the powder charge.

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