

# A 3D Tour Handgun History

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I have a new toy, a 3D printer. I am amazed at the level of quality compared to its price. I'm printing out robots, cartoon characters and as many Star Trek ship models as I can find. The darn thing is running almost 24/7 and all my shelving is filling up with little plastic objects.

First let me state that I am not a gun enthusiast. I own no fire arms and have been to a firing range once in my life. I believe that we have too many and they are too accessible, especially in the U.S. That having been said, I also have a fascination with the technological change that occurred during the industrial revolution. In some ways we are still advancing the technology that was developed in the late 19th and early 20th century.

Fire arms, especially handguns, offer a unique window into all this. Advancement did not happen through increased complexity. A modern Glock is not much more complex than a Colt 1911. The number of parts in a pistol has been in the same range for nearly 200 years. Cars on the other hand gained complexity and added system after system. Advancement did not happen through orders of magnitude in performance. A 747 is vastly more capable than the Wright Flyer. One of the basic measures of a pistol is how fast can it shoot a bullet, that parameter has not really changed much, certainly not as much as the top speed of a car.

You have a simple operating principle, put explosive powder in a tube and ignite it. Everything else is materials, ergonomics, manufacturing and clever mechanical design. Handgun development follows the usual pattern of small steady innovations, big rapid shifts and market failures. Because of the simplification, it's easier to see what worked and why.

Back to my 3D printer. I found a model of a Luger P08 and decided to print a 1/3 scale version. It came out remarkably well. I then decided to see if I could find other examples of the history that has intrigued me. Well, collecting starts innocently enough. The act of collecting can be an interesting window into understanding a topic. It forces you to fill in gaps and holes in your knowledge and creates a different kind of understanding of the material. I also found that a physical and tactile connection with information is different than visual or written information. My printing skills improved, I became better at finding things and found a certain level of joy in the act of collecting. I decided to stop at 50 (for now). A few of these items made it into the collection because I stumbled on a nice 3D model.



All the models I found (save one) are free. I felt I should give back to the larger community and publish this aggregation. I have included links to all the sources to make sure credit is given. The photos of the models, were 3D printed by me. There is a more technical discussion about the 3D printing and model preparation at the end. As you can tell, my 3D printing skills are still a work in progress. All the prints are .318 scale. I painted a few but

haven't come up with a color scheme that works at this scale. Black is tending to wash out the details. Many are translucent green because that printing material was free as part of a promotion. Many of the painted models are the green variety. I have haven't been able to capture the metallic gun blue.

I added a little description text for each. My goal was not to give a full comprehensive description but provide a few interesting bits and provide context. There is plenty of Wikipedia information on all of these. Much of the information does come from Wikipedia and a site called Forgotten Weapons (<https://www.forgottenweapons.com/>). Ian McCollum has produced and published some 1700 YouTube videos and I have borrowed liberally from them. Please visit his Patreon site (<https://www.patreon.com/ForgottenWeapons>) as well if you would like to support him.

As my printing and painting skills improve, I will update the pictures. The initial run of prints was at a very small scale and the photos tend to accentuate all the 3D printing messiness.

I have published collection on Thingiverse  
<https://www.thingiverse.com/thing:3546303>

There you will find all the 3D models. I have also listed all my model sources in this document and in a separate posted document. The Thingiverse links are links directly to the particular model in the collection already sized and scaled. You can leave me comments, criticisms and helpful tips in the comments section of the Thingiverse post.

Enjoy!

Dan  
April 7, 2019

## Chapter 1: Pre-industrial Revolution, 1600's - 1864



I decided to give a little more historical context by winding the clock all the way back to the 17<sup>th</sup> century and covering some of the innovations prior to the industrial revolution. When I started this project, I knew almost nothing about pre-civil war pistol development. Both the technologic evolution and the struggles of the innovators themselves turned out to be a fascinating story.



**1. Flintlock** - It seemed only fitting to start this story with the Flintlock. As I mentioned, the basic pistol operating principle is a tube filled with explosives and some way to set it all off. The idea to use flint that creates a shower of sparks when striking a metal plate was invented in the early 1600's. Its form was unchanged for 200 years. A flintlock dueling pistol from the 18th century had an average caliber of .5 inches and a muzzle velocity of

830 feet per second. For comparison, the Colt M1911A, standard U.S. military issued side arm for 80 years, has a .45 inch caliber and a muzzle velocity of 830 feet per second as well. Flintlock dueling pistols came in two types, smooth bore or rifled with rifled being the more accurate. There were two schools of thought. If you duelled with a less accurate smooth bore, you might be a coward. If you duelled with a more accurate rifled pistol, well, that just was not sporting.



#### Model Sources

Original : <https://grabcad.com/library/flintlock-pistol>

Thingiverse : <https://www.thingiverse.com/download:6321137>

**2. Philadelphia Deringer** - Around the 1820's there was a major innovation in how to get a tube of explosives to ignite, the percussion cap. The percussion cap is a small cylinder of copper or brass with one closed end. Inside the closed end is a small amount of a shock-sensitive explosive material such as fulminate of mercury. With the same basic mechanical mechanism as the flintlock, a hammer would strike a percussion cap. This would be more reliable and less susceptible to weather conditions. This invention would last well into the Civil War. I looked for a good model to use and decided on the Philadelphia Deringer (yes, only one 'r'). This was the pistol used to assassinate Abraham Lincoln.



Once I made the decision to use this example, I became obsessed, in that collector way, with finding a free example. I failed, broke down and purchased this model (\$7.10) The model came inside a beautifully rendered display box (this is a computer generated image from the downloaded model). I had to learn some 3D editing to extract this model.



#### Model Sources

Original : <https://www.cgtrader.com/3d-models/military/gun/weapon-set-of-philadelphia-deringer>

Thingiverse : <https://www.thingiverse.com/download:6321150>

**3. Pepperbox** - One technical problem to solve is how get more than one shot without having to reload. One answer is to equip the gun with multiple barrels that could be rotated into position and fired. This is the design of the Pepperbox. People think of this as some strange Victorian Age oddity. It was not. Sometimes called 'the gun the won the east'. They were extremely popular carried by a lot of people for several decades. One of the more popular models was the Allen and Thurber. It was a double-action, black powder and percussion cap pistol. Allen and Thurber made a gazillion of these and did rather well for themselves. Because they were smooth bore and very front heavy, they were not very accurate, and no military adopted them. However, for personal defense at close range, they were more than adequate.



#### Model Sources

Original : <http://www.cadnav.com/3d-models/model-10893.html>

Thingiverse : <https://www.thingiverse.com/download:6321145>

Shout out to Tim Barry for helping me convert the .MAX file

Check out his work at - <https://www.sculptorwanted.net/>

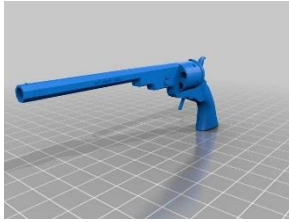


**4. Colt Paterson** - In 1836 Samuel Colt patented a design for a pistol with a revolving cylinder and one barrel. It should be noted that some of his thinking was based on a cylinder equipped flintlock called the Collier flintlock. In the Collier you had to manually rotate the cylinder. Colt's big idea was to have the cocking of the hammer also rotate the cylinder. He raised some money, built a factory and was driven to near financial ruin.

It is great tale of grit, bad choices and pure luck that eventually lead him to success. The Colt Paterson (named for the city in New Jersey where he set up shop) was the first truly successful revolver and really the start of the revolver story. It was loaded with black powder and ignited with the newfangled percussion cap. The downside was that you practically had to disassemble the gun to load it. About 2,800 were made. He had no sales after he built the first 1,000.

You will notice that the picture seems to have no trigger. The Paterson had a folding trigger that only revealed when the gun was cocked. The model I found is incorrect and does show the trigger. I removed it prior to printing. The website I downloaded the model from lists it as a 'supernatural colt'. I think it's featured on some TV show.

The 5 shot revolver proved to be unreliable and fragile. Colt expected military contracts to roll on in. They did not. A subsequent patent renewal in 1849, and aggressive litigation against infringements, gave Colt a domestic monopoly on revolver development until the middle 1850s.



#### Model Sources

Original : <https://grabcad.com/library/supernatural-colt-patterson-1>

Thingiverse : <https://www.thingiverse.com/download:6321121>



**5. Colt Walker** - The Colt Paterson was a technological success but a market failure. The company's shareholders took control and Colt was relegated to sales agent. In 1842, the company was forced to close, and its fixtures and inventory of guns and gun parts were auctioned off to the highest bidder. Enter Texas Ranger Captain Samuel Hamilton Walker (yes, that would be 'Walker, Texas Ranger'). Captain Walker was impressed with

the advantages of a pistol that could have 5 shots immediately ready with no reload in between. He approached Colt in 1847 with a request to build a version that had the same punch as a rifle. Colt created the Colt Walker, a .44 caliber, 4 1/2-pound hand cannon. The Texas Rangers placed an order for 1,000 of them. Company saved, Colt is back in business.

The Colt Walker was the most powerful handgun on the market, and it held that distinction until 1935 with the introduction of the .357 magnum. In the 1976 movie, The Outlaw Josey Wales, the Clint Eastwood character brandishes two Walkers. As a side note, in the movie Dirty Harry, he carries the 44 magnum, also at the time, the most powerful hand gun in the world. I guess he's got a thing for big guns.





#### Model Sources

Original : <https://grabcad.com/library/91991>

Thingiverse : <https://www.thingiverse.com/download:6321152>



**6. Colt 1851 Navy** - With the success of the Walker, Colt rises from the ashes. Samuel Colt goes on to produce model after model based on the same basic design. This print is the Colt 1851 Navy. Colt sold over 200,000 units compared to the 1,100 Walkers produced. These 3D prints are to scale. Colt is selling to the U.S. Army, the Navy and internationally. The Colt .44-caliber "Army" Model 1860 was the most widely used revolver of the Civil

War. A major cause of Colt's success was vigorous protection of his patent rights. At the same time, Colt's policies forced some competing inventors to greater innovation by denying them major features of his mechanism; as a result, they created their own.



#### Model Sources

Original : <https://grabcad.com/library/293512>

Thingiverse : <https://www.thingiverse.com/download:6321123>

Samuel Colt died in 1862 (at 47) a wealthy man.

The state of the art in revolvers still required loading each cylinder with black powder, a bullet and a percussion cap. Revolvers offered rapid fire but reloading took several minutes. Powder had to be measured into each cylinder, a bullet loaded and a percussion cap placed at the end of each cylinder. The whole package was compressed with an integrated ramrod positioned under the barrel. Sometimes a little lard was added to the top of each cylinder to help hold things in place, prevent the simultaneous ignition of the other rounds and help speed the bullet down the barrel. In the 1850's the integrated metallic cartridge was coming into being. (picture).

In the 1850's, there was technological advancement but interestingly enough, legal issues drove progress. Colt's iron grip on revolver technology was about to change as his patents were set to expire in 1856. Additionally, a new innovation was coming to market. An integrated cartridge that combined powder, percussion cap and bullet in a single package. A gunsmith working for Colt named Rollin White approached Colt with the idea of boring a hole straight through the cylinder of a revolver so it could

accept this new integrated cartridge. Colt fired him for messing with his designs. Rollin went off and patented the idea (seems like an obvious idea to me). More on Rollin's adventure later.



**7. Volcanic Pistol** - This is a fascinating tale of ruin and redemption. For a good telling, check out the video on Forgotten Weapons. The goal was to create a system to store ammunition in the gun and load each round and fire through a single barrel. Colt owned the patent rights for using a revolving cylinder. The original 1848 Volition Repeating Rifle design by Walter Hunt was revolutionary, introducing an early iteration of the lever

action repeating mechanism and the tubular magazine still common today. However, Hunt's design was far from perfect, Lewis Jennings patented an improved version of Hunt's design in 1849,

In 1854, partners Horace Smith and Daniel B. Wesson joined with Courtlandt Palmer, the businessman who had purchased who had purchased the Jennings patent rights and further improved on the operating mechanism, developing the Smith & Wesson Lever pistol (later rebranded the Volcanic Pistol, sounds cooler).

After about a year of production, they were nearly bankrupt. Enter Oliver Winchester (yes, of the future Winchester repeating rifles) and with an infusion of cash, they tried again, and again failed. At this point Smith and Wesson were tired of the whole thing.

Winchester forced the insolvency of the Volcanic Arms Company in late 1856, took over ownership and moved the plant to New Haven, Connecticut, where it was reorganized as the New Haven Arms Company in April 1857. B. Tyler Henry was hired as plant superintendent. While continuing to make the Volcanic rifle and pistol, Henry began to experiment with the new rimfire ammunition, and modified the Volcanic lever action design to use it. The result was the Henry rifle. By 1866, the company once again reorganized, this time as the Winchester Repeating Arms company, and the name of Winchester became synonymous with lever action rifles and sold all. The basic mechanism in the Winchester repeating rifle is the same as the Volcanic Pistol.

Out of this 'failed' venture, both the Smith & Wesson Revolver company and Winchester Repeating Arms was created.



#### Model Sources

Original : <https://3dwarehouse.sketchup.com/model/57a8cbc9-ef7a-4b94-bc8f-811dd38dfbfb/Volcanic-Repeating-Pistol>

Thingiverse : <https://www.thingiverse.com/download:6321122>

Forgot Weapons Video

<https://www.youtube.com/watch?v=RZBHTOYHY6Y>

**Smith & Wesson Model 1** - Now Smith and Wesson, fresh from their Volcanic failure and sale to Winchester were looking to capitalize on the expiration of Colt's revolver patents. They connected with Rollin White (ex-Colt employee and holder of a key patent) and struck a deal for his bore through cylinder patent. They would pay Rollin 25 cents per revolver produced but Rollin was responsible for protecting and litigating any patent infringement. Rollin accepted. Two notes, patent protection turned out to be a legal nightmare for Rollin and it financially ruined him and the patent also prevented Colt from being able to build cartridge firearms for almost 20 years.



Smith and Wesson released their Model 1 in 1857. It was a runaway hit. Orders came in faster than they could produce them. I was unable to find a 3d model but felt this was important to include in the history. In 1876, Smith and Wesson followed with the Model 2. It was also very successful and both established S&W as a premier cartridge revolver manufacturer.

Unfortunately, I could not find any 3D Models of the Model 1 or Model 2. Because of their importance to the story, I have included them here.

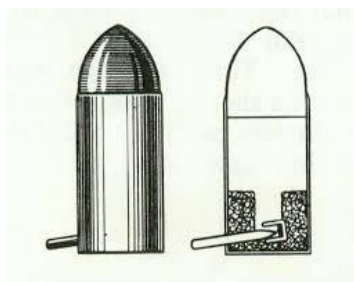


8  
6 Shot Lefauchaux M1858



10 Shot Lefauchaux M1858

**8.Lefauchaux M1858** - Meanwhile, across the pond, the Europeans were hard at work. One of the more successful designers was Casimir Lefauchaux and his son, Eugene. Casimir patented the pinfire cartridge. As its name implies, it uses a little pin built right into the cartridge



The 1854 model revolver was the first metallic-cartridge revolver adopted by a national government (France); the 1858 was the first variant fielded. Lefauchaux went on to produce all kinds of guns; 6 shot revolvers, 10 shot revolvers (model here), 20 shot revolvers (YIKES) and pepperboxes. He patented his designs in Europe but not the U.S. Not sure if he would have run afoul of the Rollin White patent as his guns also had a bore through cylinder. It is thought likely that the revolver with which Vincent van Gogh fatally shot himself in a field in 1890 was a Lefauchaux



#### Model Sources

6 Shot

Original : <https://grabcad.com/library/lefauchaux-m1858-3rd-type-12mm-6shoot-cherry-blossom-mt-fuji-3d-print-kit-toy-gun-1>

Thingiverse : <https://www.thingiverse.com/download:6321153>



10 Shot

Original : <https://grabcad.com/library/lefauchaux-m1858-3rd-type-12mm-10shoot-3d-print-kit-toy-gun-1>

Thingiverse : <https://www.thingiverse.com/download:6321154>



**9. Remington Model 1858** - In 1864 the Colt factory burned. The U.S. government could not get the Colt Army 1860's they ordered so they turned to the secondary pistol they had ordered, the Remington Model 1858 to fill the order. They were more durable and had a simpler mechanism than the Colt. It was also 50 cents more expensive. Another interesting feature is the pistol permitted easy cylinder removal, allowing a quick reload with a spare

pre-loaded cylinder. It was designed as a black powder, cap and ball pistol. I include it here because Remington decided to pay a royalty fee to Smith & Wesson for the bored through cylinder license fee. The Remington Army cartridge-conversions were the first large-caliber cartridge revolvers available, beating even Smith & Wesson's .44 American to market by nearly two years. Famously, the Italian resistance fighters used the model "44 mor Syracuse" during World War II.



#### Model Sources

Original : <https://grabcad.com/library/remington-1854/details>

Thingiverse : <https://www.thingiverse.com/download:6321155>

The hammer did break when I was removing the supports so I glued it back with the hammer down.

## Chapter 2: The Modern Revolver 1865 - 1899



After the civil war the industrial revolution picks up the pace. With the invention of the integrated cartridge and improved manufacturing the modern form of the revolver takes shape. The pistols models that emerge during this period last well into the 20<sup>th</sup> century and the basic form and layout for the pattern of the modern revolver comes into being.

**10. Remington Model 95** - Often called the Derringer. Derringer (with two R's) had become synonymous with small, concealable handguns. Deringer (with one R), like the one previously mentioned was actually made by John Deringer. The term became like Kleenex or Scotch Tape. The Remington Derringer was introduced in 1865 and held two .41 caliber integrated metallic cartridges. About 150,000 were produced by Remington up until 1935 (a 70 year run). Though not a revolver, it was a multi-shot hand gun that was produced well into the 20<sup>th</sup> century. In the TV show *The Wild Wild West*, our hero, Jim West carried up to three. One concealed in his holster, one up his sleeve and one broken into two parts with the barrel-chamber assembly hidden in the hollowed-out heel of one boot and the frame hidden in the heel of the other.





#### Model Sources

Original : <https://3dwarehouse.sketchup.com/model/f312cc80a6882945d46f836157a4e3c0/Remington-Double-Derringer>

Thingiverse : <https://www.thingiverse.com/download:6321159>



**11. Smith & Wesson Model 3** - Following the successes of the Model 1 and Model 2, Smith & Wesson released the Model 3 in 1870. This would eventually be a direct competitor to Colt's Single Action Army (Peacemaker) released 3 years later. The Model 3 was the first cartridge revolver adopted by the U.S. Army. Many models were produced including a special edition for the Russian Empire. Smith & Wesson nearly went bankrupt as a result of

their Russian Contract production, as the Imperial government assigned a number of engineers and gunsmiths to reverse-engineer the Smith & Wesson design, and then began to produce copies of the revolver.

The model I found is the "Schofield" model, named after Major George W. Schofield, who made his own modifications to the Model 3 to meet his perceptions of the Cavalry's needs. Smith & Wesson incorporated these modifications into an 1875 design they named after the Major, planning to obtain significant military contracts for the new revolver. After the Spanish–American War of 1898, the US Army sold off all their surplus Schofield revolvers.

Of the most notable purchasers of these reconditioned Model 3 Schofield revolvers was Wells Fargo and Company, who purchased the revolvers for use by Wells Fargo Road Agents and had the barrels shortened to a more concealable 5 inches length.

The Wells Fargo Schofield revolvers became so popular with collectors from the 1970s onwards that the unique Wells Fargo markings were being "counterfeited" or "faked" by unscrupulous sellers to enhance the value of other similar versions that had not been genuinely owned by Wells Fargo & Co. There are more "fake" Wells Fargo marked Schofield revolvers than genuine ones in existence.

Lieutenant Colonel Schofield shot himself on December 17, 1882, with a S&W Schofield revolver after suffering a bout of mental illness, stress and isolation.

The Model 3 was in production for 45 years and was the gun that almost won the west. Note the very modern looking profile. It still retained a 'tipping barrel' loading mechanism from the earlier models.



#### Model Sources

Original : <https://www.cgtrader.com/free-3d-models/military/gun/schofield-3-co2-bb>

Thingiverse : <https://www.thingiverse.com/download:6321156>

**12. Colt Single Action Army** - Colt stayed out of the cartridge revolver market until 1873, not wanting to pay any royalty fees to Smith & Wesson, Colt simply waited for the patent to expire. The U.S. Army had already adopted the Smith & Wesson Model 3 but in head testing, the new Colt was simply deemed better. There is no more iconic revolver than the Colt SAA, the Peacemaker. This and the Winchester repeating rifle were the 'guns that won the west'. Colt even produced a version that fired the same cartridges as the Winchester so people needed to carry only one kind of ammunition.



The Colt SAA has been offered in over 30 different calibers and various barrel lengths. Its overall appearance has remained consistent since 1873. Colt has discontinued its production twice but brought it back due to popular demand. It is still produced today. The revolver was popular with ranchers, lawmen, and outlaws alike, but as of the early 21st century, models are mostly bought by collectors and re-enactors.

The very first production Single Action Army, serial number 1, thought lost for many years after its production, was found in a barn in Nashua, New Hampshire in the early 1900s.



#### Model Sources

Original : <https://free3d.com/3d-model/colt-peacemaker-93133.html>

Thingiverse : <https://www.thingiverse.com/download:6321199>



**13. Mauser C78 "Zig-Zag"** - In 1879 the newly formed German Empire was standardizing its weapons. The Mauser brothers had already won the contract to supply rifles. They thought it would be great to also supply pistols. This is the first and only revolver designed by Mauser. It used an unusual mechanism to rotate its cylinder. Typically there is a 'hand' behind the cylinder that pushes up against the back of the cylinder to

cause it to rotate. The Mauser C78 had a 'zig-zag' cam carved into the cylinder. There was a pin in the bottom of the frame that followed this cam to rotate the cylinder. This rotation scheme is also used by the Webley-Fosbery Automatic Pistol. Mauser lost the contest to the Reichsrevolver. It did find a small home in the civilian market. Their next pistol from Mauser would be the C-96 Broomhandle semi-automatic.



#### Model Sources

Original : <https://grabcad.com/library/mauser-c78-10-6mm-3d-print-kit-toy-gun-1>

Thingiverse : <https://www.thingiverse.com/download:6321164>

#### **14. M1897 Reichsrevolver** - From

Forgottenweapons.com "We are used to German small arms being highly efficient and modern for their times, but the Reichsrevolver is an exception to that trend.

The first centerfire adopted by the newly formed German empire, the model 1879 Reichsrevolver had traits we would typically associate with Russian arms rather than German. It was simple (too simple in some ways) and very durable, at the expense of not being very conducive to fast or efficient shooting. The Germans realized some of its problems, and in its initial form it only remained a standard front-line weapon until 1883 when improvements were made including shortening the barrel by 2 inches. An interesting 'feature' was that there was no cartridge ejector. Removing empty cartridges could be done by removing the cylinder by withdrawing the axis pin, and then removing the casings by hand, but in actual practice a separate small rod (stored in the ammunition pouch) was used to push the casings out without having to remove the cylinder. It remained in service until 1908 when it was replaced by the Luger.



#### Model Sources

Original :

<https://assetstore.unity.com/packages/3d/props/guns/reichsrevolver-m-1879-63609>

Thingiverse : <https://www.thingiverse.com/download:6321162>



**15. Webley Revolver (MK VI pictured)** - The Webley was introduced in 1887 and was standard issue service pistol for the armed forces of the United Kingdom, and the British Empire and Commonwealth, from 1887 until 1963 (76 years!). It's what is called a top break. The gun splits in two on a hinge for loading. (Picture here).

The Webley Mk VI (.455) and Mk IV (.38/200) revolvers were still issued to British and

Commonwealth Forces after the Second World War; there were now extensive stockpiles of the revolvers in military stores, yet they suffered from ammunition shortages. This lack of ammunition was instrumental in keeping the Webley revolvers in use so long: they were not wearing out because they were not being used. An armorer stationed in West Germany joked by the time they were officially retired in 1963, the ammunition allowance was "two cartridges per man, per year."



Model Sources

Original : <https://grabcad.com/library/webley-mk-6-1>

Thingiverse : <https://www.thingiverse.com/download:6321204>



**16. Nagant M1895** - When the Russian Empire decided to replace the various Smith & Wesson Model 3s, both purchased and counterfeited. They turned to a Belgian industrialist Léon Nagant. In 1895 the Nagant was adopted as the standard issue side arm for the Imperial Russian Army and police officers. While it was slowly replaced by automatic models it hung around for a very long time. In the Russian Federation, it was

only retired from use with postal security service in 2003, and from bailiff security service in 2009. Over two million were produced and in service (in one form or another) for 114 years.

The Nagant had some interesting features. First of which, it held seven shots, not six. Revolvers typically have a small gap between the cylinder and the barrel to allow the cylinder to revolve. The bullet must "jump" this gap when fired, which can have an adverse effect on accuracy, especially if the barrel and chamber are misaligned. The gap also is a path for the escape of high-pressure gases. Expensive revolvers were hand-fitted, keeping the gap to a minimum. Mass-produced revolvers may have a gap as large as 0.25 mm.

The Nagant by contrast, has a mechanism which, as the hammer is cocked, first turns the cylinder and then moves it forward, closing the gap between the cylinder and the barrel. The cartridge, also unique, plays an important part in sealing the gun to the escape of propellant gases. The bullet is deeply seated, entirely within the cartridge case, and the case is slightly reduced in diameter at its mouth. The result was higher accuracy and greater power. The downside was they were a pain to reload. This sealed approach lent itself to suppressors (silencers). Suppressed M1895 Nagant revolvers, modified in clandestine workshops, also turned up in the hands of Viet Cong guerrillas during the Vietnam War as assassination weapons.

In typical Russian fashion, these were very tough and reliable. As one former Imperial Russian officer stated, "if anything went wrong with the M1895, you could fix it with a hammer"



#### Model Sources

Original : <https://grabcad.com/library/nagant-3>

Thingiverse : <https://www.thingiverse.com/download:6321177>



Smith & Wesson 4 inch barrel



Smith & Wesson 6 inch barrel

**17. Smith & Wesson Model 10** - In 1899 Smith & Wesson released the Model 10, sometimes called the Smith & Wesson Military & Police or the Smith & Wesson Victory Model. It has been in production ever since and has sold more than 6 million in various forms making the most popular handgun of the 20th century. This also represents the basic form factor of modern revolver (Colt and others also adopted this basic form, Colt in 1889). I chose the Smith & Wesson as the Colt 1889 was not as successful. It features six cylinders, center fire cartridges and a swing out loading and unloading mechanism. Note the date, 1899.

#### Model Sources

I have two examples. One has a 6 inch barrel and the other a 4 inch.



6 inch barrel

Original : <https://grabcad.com/library/2946>

Thingiverse : <https://www.thingiverse.com/download:6321161>

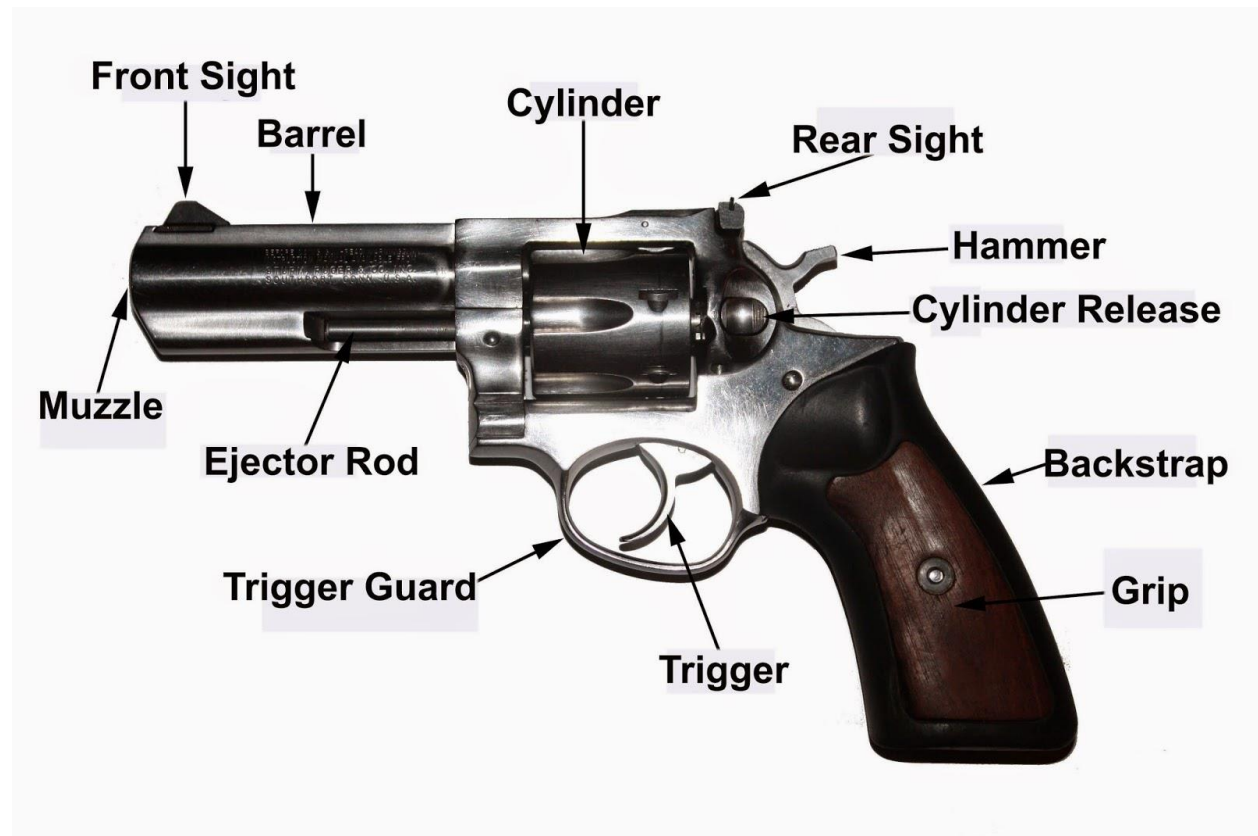


4 inch barrel

Original : <https://3dwarehouse.sketchup.com/model/5d03a87c-b484-4dbd-969c-782478e53c3b/Smith-Wesson-Model-10>

Thingiverse : <https://www.thingiverse.com/download:6321194>

With the Model 10, innovation in revolvers starts to wind down. Not much has changed since the close of the 19th century in revolver design. It took 63 years (1836-1899) for the design to reach its current form.



## **Chapter 3: Birth Of The Semi-Automatic Pistol 1891 - 1900**



In the 1880's two technological events were happening. Smokeless powder was invented, and the state of metallurgy had progressed to a more modern state. The combination of these two made it possible to conceive of a self-loading or semi-automatic hand gun. In the late 1880's designers began experimenting with designs that would use the energy from a fired round to drive machinery that would automatically load the next round.

The 9 years covered in this chapter was an absolute technical explosion. Like the early days of the automobile, the airplane or the microcomputer those first years always seem compressed in time and most of the later innovations can be traced to any of these early periods. Ideas and experiments were driven at breathtaking pace. Some of the ideas generated are still with us, others only helped point the way.



**Salvator-Dormus and Schoenberger-Laumann** - The story starts in 1891 with early attempts at creating

a self-loading, semi-automatic pistol. These are the first two. The Salvator-Dormus took the prize as first just beating the Schonberger-Laumann in patent filings by just a few months. Here are some quick notes:

I'll start with the Schoneberger-Laumann as it was actually based on a manual repeating pistol design. The Laumann pistol used a lever, much like the Volcanic to cycle rounds from a magazine. It was a straight path to replace the hand operated lever with a spring to capture the recoil energy and do the work that a hand would do.

The Salvator-Dormus was designed from the ground up as a semi-automatic pistol. It is surprisingly modern and did not have the benefit of any previous designs by themselves or others. A couple of funky things. Its action is what's called a delayed blowback. Hot gasses from the cartridge are used to power the machinery. Sometimes a slight delay is needed to keep the pressures up in the barrel. The Salvator-Dormus used the actual pressure of the shooter's finger to supply that delay. It was fed with a stripper clip from the top (more on that later). When the clip was empty the bottom would fall into the hollow grip. The grip would fill up with clips and there was a little door at the bottom to empty it.

Only a few dozen of each were produced but each went through a series of refinements and modifications but no commercial success or military adoption. However, this does mark the beginning of the semi-auto pistol story.

Still in the hunt for 3D models.



**18. Borchardt C-93** - This was really the first commercially successful semi-automatic pistol. Created by Hugo Borchardt in 1893, just two years after the Salvator-Dormus it sold around 3,000 units. Not a homerun, but successful enough for people to take notice. Many of his basic ideas were innovative and influential. Many live on in other designs. The idea that you would put cartridges in a box magazine that is inserted into the grip is now

standard. He also designed a very effective cartridge designed solely for use in an automatic. The large bulb on the end was the spring that drove the toggle bolt (the toggle idea he borrowed from the Maxim machine gun). Does this toggle remind you of any other gun? When it was tested by the Swiss army, they came back with some suggested modifications. Borchardt refused, feeling that his creation was good as it was. The sales agent for the manufacturer was Georg Luger.

The cartridge design was hugely successful. The Borchardt cartridge was the basis for the 7.63×25mm Mauser. By extension, the Borchardt cartridge was also the basis for the 7.62×25mm Tokarev cartridge. The 7.65×25mm Borchardt was also the basis of the 7.65×21mm Parabellum and 9×19mm Parabellum cartridges developed for the Luger pistol. This cartridge is still in use today as the ubiquitous NATO round.

This story continues...



#### Model Sources

Original : <https://sketchfab.com/3d-models/borchardt-c93-de7f9a89570045e6a406e53a910346ac>

Thingiverse : <https://www.thingiverse.com/download:6321230>

**19. Mauser C-96 "Broomhandle"** - Just 3 years after the introduction of the Borchardt, Mauser introduces its automatic pistol. It goes on to sell over a million units and is in productions until 1937. The Mauser cartridge was based on the Borchardt cartridge. They were dimensionally the same and the Mauser and Borchardt shared a manufacturer, they gave Mauser permission to use it. Mauser stuffed it with more explosives', and it was the highest velocity commercially manufactured pistol cartridge until the advent of the .357 Magnum cartridge in 1935. Paul Mauser did not actually design this pistol. Three brothers employed by Mauser worked on it. Mauser was upset that they were doing this on company time, so he ordered them to stop. They continued on their own time. When Mauser saw the success of the Borchardt and the development happening around him, he sanctioned the project. It developed a worldwide fan based but no government officially adopted it. The 3D model I found is Brazilian. The markings are in Portuguese. The selector switch is marked N for normal (semi-automatic) and R for rápido ("rapid" for fully automatic). Han Solo's blaster prop is actually a tricked out Mauser.



Clint Eastwood uses one in Joe Kidd





#### Model Sources

Original : <https://grabcad.com/library/mauser-711-nikl-design>

Thingiverse : <https://www.thingiverse.com/download:6321257>



**20. Bergmann 1896** - Theodore Bergmann was a classic industrial age entrepreneur. He worked on bicycles and automobiles. He had a particular fondness for pistols. From 1893 to 1910 he patented a new Bergmann model pistol every year. The Bergmann 1896 was a semi-automatic pistol developed by German designer Louis Schmeisser and sold by Theodor Bergmann's company. A contemporary of the Mauser C96 and

Borchardt C-93 pistols, the Bergmann failed to achieve the same widespread success. Still he sold some 4,000 units (in use up until WW I) and he continued to produce models and competed for military contracts with the big boys up until 1910. His company still exists as a plastics manufacturer. Note the similarities between the Bergmann 1896 and Shonberger-Laumann.



#### Model Sources

Original : <https://3dwarehouse.sketchup.com/model/57e256e7-7403-4ef7-a831-616f634603cc/Bergmann-1896>

Thingiverse : <https://www.thingiverse.com/download:6321228>



**21. Maxim-Silverman** - 1896 was a busy year. Hiram Maxim is best known for the Maxim Machine Gun, but he and (most significantly) his assistant Louis Silverman also dabbled in handgun design. It appears that the work was primarily Silverman's, done with the tacit support of the Maxim company. It was simple, elegant and easy to produce (only 16 parts). Note, a version fired the Borchardt cartridge. It had a box fed magazine in the grip, striker-based firing mechanism and an

ergonomic 45 degree grip angle. It also just looks cool and certain mechanical, design and aesthetics show up in later pistols. Although well ahead of its time, the Maxim-Silverman never went into production. Maxim may have been too busy making his machine gun. Only a handful of prototypes exist. Interesting video : <https://www.youtube.com/watch?v=F1ElpucXu6A>



#### Model Sources

Original : <https://sketchfab.com/3d-models/p03c-louck-t-maxim-silverman-1896-final-d1ad719be9c0403bb173cb464ea1bbcf>

Thingiverse : <https://www.thingiverse.com/download:6321219>

Note: this model had the end striker extended. That was difficult to print so I removed the extension.

**Webley-Fosbery Automatic Revolver.** I'm going to take a moment to give an honorable mention. In the mid to late 1890's, automatic pistols were very new and not really ready for prime time. Lieutenant Colonel George Vincent Fosbery, VC had the clever idea of using the recoil energy to drive the machinery in a revolver. He devised a revolver that cocked the hammer and rotated the cylinder by sliding the action, cylinder and barrel assembly back on the frame. The prototype



was a modified Colt Single Action Army revolver. Fosbery patented his invention 16 August 1895. He did this by detaching the frame from the handle and putting it on spring loaded rails. Much like the M78 Mauser Zig-Zag he cut a groove in the cylinder that acted like a cam to rotate the cylinder, pretty clever. The Colt really couldn't stand up to the punishment so Fosbery turned to the more robust Webley. The Webley-Fosbery Automatic Revolver was introduced at the matches at Bisley of July 1900. It was a modest success and was produced up to 1924. In the Dashiell Hammett book *The Maltese Falcon* and the 1941 Warner Bros film, *Sam Spade's* partner, Miles Archer, is shot and killed with a Webley-Fosbery Automatic Revolver.



**22. Bergman-Simplex and 23. Bergman-Baynard** - The thing about industrial age industrialists is just how industrious they are. As I mentioned before Theodore Bergman was patenting a new pistol every year from 1893 to 1910. After the moderate success of the Bergmann M1896 and using some of those innovations he produced a series of similarly designed pistols. I have two examples, the Bergmann-Simplex and the Bergmann-Baynard. Both have a very Mauser C-96 look to them, like the Mauser, loaded with the stripper clip fed magazine in front of the trigger.

Theodor Bergmann was tenacious in his pursuit of a military pistol contract, but the sales of the 1896 and 1897 model Bergmann pistols showed him that a single design could not effectively suit to both the military need for a powerful cartridge and the civilian demand for a small and concealable pistol. In order to pursue both parts of the market, Bergmann split his efforts, scaling down and simplifying the design into the civilian Simplex and beefing it up for the Bergmann-Baynard military pistol. I include these in this chapter as the basic ideas are pre-1900. Bergmann did have some commercial success post 1900 but I felt these really belonged here.

Bergmann–Bayard Model 1903 was adopted by the Spanish army in 1905 and Bergmann–Bayard model 1910 was adopted by the Danish military. The pistol was produced in Belgium until 1914, when production ceased during World War I and never resumed. The Bergmann–Bayard was later produced in Denmark from 1922 to 1935. Bergmann–Bayard pistols in .45 ACP were submitted for US army trials in 1906, but were unsuccessful. Unlike some of the other producers (Colt, Steyr, Mauser) Bergmann has faded into history.



#### Model Sources

Bergmann-Simplex

Original : <https://sketchfab.com/3d-models/bergmann-simplex-bc8ca97ff3664b89a4f8a1d10d3b6d22>

Thingiverse : <https://www.thingiverse.com/download:6321223>



Bergmann-Baynard

Original : <https://sharecg.com/v/77399/view/11/Poser/Bergmann-Pistol>

Thingiverse : <https://www.thingiverse.com/download:6321246>



**24. Steyr-Mannlicher M1905** - So the self-loading arms race is heating up in Europe. The "Modelo 1905" is a pistol designed by Ferdinand Ritter von Mannlicher in 1899. After a few rounds of refinement, Steyr produces the M1905 and sells a few to the Argentine Army. It enters all the field and endurance tests. All the usual suspects are participating, Mauser, Luger, Borchardt, Roth etc. Luger is consistently winning these trials.

The M1905 does not win any adoptions beyond Argentina but Steyr stays competitive. Steyr was founded in 1864 and is still in the fire arms business today. I felt this belonged in this chapter for the same reason as the Bergmanns. Most of the innovation happened pre-1900, limited commercial success and a form that quickly faded.



#### Model Sources

Original : <https://www.sharecg.com/v/71900/related/11/Poser/Steyr-Mannlicher-M1905-Pistol>

Thingiverse : <https://www.thingiverse.com/download:6321244>

Han Solo's modified Mauser



## **Chapter 4: Prime Time. The Modern Form 1900 - 1912**



The second half of this 20 year cycle, starting in 1900 is an explosion of successful designs and wide scale adoption. Many of the design elements that emerge here are still in use today. Some of these models are produced for decades and most modern pistols can trace their origins back to this time compressed time period.

**25. Luger** - When Hugo Borchardt refused to make any of the modifications that the Swiss Army had requested, the manufacturer (DWM) turned to a sales agent that was working for them to promote the Borchardt. His name was Georg Luger and he was assigned the task of making the requested modifications. Luger may or may not have been a great gun designer, but he excelled at improving other's designs. He moved the bulbous spring from the back of the Borchardt and put into the grip. He also added the iconic angle to the grip itself. Much of the internals, including the toggle remained the same as the Borchardt.





Viola, in 1900 the Swiss adopt it and it was off to the races. It was adopted by the German Imperial Navy in 1904, participated in the U.S. pistol trials of 1907 (as a .45 caliber) and adopted by the German Army in 1908. Some 3 million are produced between 1900 and 1943. The 9mm Parabellum cartridge would also form the basis for the NATO round. You will also see its influence on other future pistols. It is one of the most iconic and recognizable pistols in the world, even to non-gun people. The time from the Borchardt C-93 to the Luger would only be 7 years. It bothered Hugo Borchardt to the end of his days that Luger received more credit for the basic design than he did.

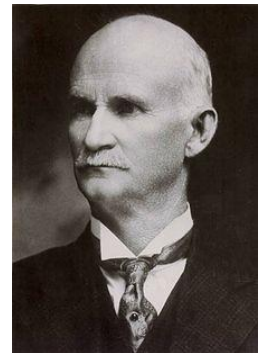


#### Model Sources

Original : <https://www.thingiverse.com/thing:1712408>

Thingiverse : <https://www.thingiverse.com/download:6321271>

No arms designer cast a larger shadow than John Moses Browning. Some of his designs are still in use today and his influence towers above any of his peers. Why is that? Are his designs that much better? Are his designs more complex, more simple, more reliable, easier to manufacture or a combination of all these factors. I don't know the clear answer but there must be something there to create such dominance in highly competitive literal arms race. Maybe that 'it' factor is not easily definable, like the notion of 'quality' in Zen And The Art Of Motorcycle Maintenance'. I think there is much to learn by studying clearly successful and superior design.





**26. Browning 1900** - In the late 1890's everyone was experimenting with semi-automatic pistol design. J.M. Browning of course threw his hat into the ring. In 1896 he designs his pistol and presents it to a Belgian manufacturer. Why Belgian is a story for another time. In 1900 they release the Browning 1900. One of Browning's ideas was to use a slide that surrounds the barrel. This design element would come to dominate

automatic pistol design. which appears in approximately 99% of all modern self-loading handguns. The 1900 was the first to feature this. Over the next 10 years this, and other key Browning innovations would be refined. By today's standards the spring-above-the-barrel design is unusual. However, the gun was the first truly successful commercial self-loading pistol selling 700,000 units. I will include a few other Browning models from this 10-year period.



#### Model Sources

Original : <https://grabcad.com/library/15307>

Thingiverse : <https://www.thingiverse.com/download:6321266>

**27. Colt M1900** - In the late 1890's Colt also sold a full length barrel slide design to Colt which they also released in 1900. Now you can start to see the basic form factor emerge. Only about four thousand were produced but it marked the start of an evolutionary cycle that would lead to the Colt 1911. The United States War Department solicited designs of semiautomatic pistols in 1899, and chose three samples to test; recoil-operated Mauser C96 "Broomhandle", the unusual "blow-forward" action Steyr Mannlicher M1894, and the Browning-designed Colt M1900, which was not ready until after testing started. Testing consisted of accuracy, penetration, and reliability tests, ergonomics (or ease-of-use) testing, and torture tests. The Army felt it was still too early to adopt a semi-automatic pistol, but the Colt was the clear winner. Note, the recoil spring is now below the barrel.





#### Model Sources

Original : <https://3dwarehouse.sketchup.com/model/u6d6aee42-c75b-4e92-bd99-47b40a7e4bda/Colt-M1897>

Thingiverse : <https://www.thingiverse.com/download:6321270>



**28. Browning 1906** - Every age seems to need a derring scale pistol. Browning is having a busy decade and filled this niche with a Browning design. It is virtually identical to the Colt Model 1908 Vest Pocket, which was based on the same John Browning prototype, and was the inspiration for FN's later Baby Browning design. Although Browning's handgun patents were sold to both FN and Colt, this was the only case in which both

companies put the same design into production without any significant modification. It had a total length of 4.5 inches and fired a .25 ACP and was produced from 1906 to 1959. Its offspring, the Baby Browning was put into production in 1931 and is still produced today.



#### Model Sources

Original : <https://grabcad.com/library/browning-m1906>

Thingiverse : <https://www.thingiverse.com/download:6321276>

After only about 10 years of rapid experimentation and development, the semi-automatic pistol was ready for prime time. From 1907 to 1912 the major military powers will switch over and adopt this technology. Many of these models would be produced for several decades.

**Roth-Steyr M1907** - I do not yet have the 3D model but I felt this was worth including. It was the first adoption of semi-automatic service pistol by the land army of a major power. Before Luger and before Colt, the Roth-Steyr was adopted by the Austro-Hungarian Cavalry. From 1908 to 1914, approximately 99,000 weapons were manufactured. Its shape is reminiscent of the Salvator-Dormus. Notice how the production numbers are beginning to increase



**29. Frommer 1910** - As a Hungarian, I could not ignore Rudolf Frommer. Frommer's first pistol design was the Model 1901, which reached market in 1903 and was not successful (only about 200 were made). It was submitted to several military trials but did not win any of them. As we have seen, weapons design at the turn of the century was about staying in the game. His third attempt, the Model 1910 was a moderate success and was

adopted by the Hungarian police. At fewer than 10,000 units it was still not a huge success. Determination would pay off with his next pistol.



#### Model Sources

Original : <https://www.sharecg.com/v/39065/browse/5/3D-Model/Frommer-1910-Pistol>

Thingiverse : <https://www.thingiverse.com/download:6321272>

**30. Frommer Stop** - Frommer hits it big with the Frommer Stop. It was adopted as the official sidearm of the Hungarian Armed Forces. It was also used in the WW I by the Ottoman Empire. Its distinguishing characteristic was the tube running along the top of the barrel. This housed the recoil spring. According to Wikipedia it could be used as a double barrel machine gun.



The Frommer Stop pistol was also used in a dual-mounted tripod that fired both pistols in full automatic. The pistols were inserted upside-down and fed from 25 round box magazines. Here is a picture of what that looked like:



#### Model Sources

Original : <https://www.sharecg.com/v/38938/3D-Model/Frommer-Stop-Pistol>

Thingiverse : <https://www.thingiverse.com/download:6321275>

**FN 1910 (Browning 1910)** - Browning is producing designs throughout the first decade of the 20th century. The FN 1910 (manufactured by Fabrique Nationale of Belgium) is hugely successful and influential. Its recoil spring was wrapped around the barrel. The Walther PPK and the Russian Makarov would do the same. Other design elements would echo for 100 years. It was produced from 1910 to 1983. This was the pistol used to assassinate Archduke Franz Ferdinand of Austria in Sarajevo in 1914, igniting World War I. Still looking for a 3D model.



**31. Colt M1911** - There are books written about the Colt M1911 so I will gloss over much. Adopted by the U.S. Military in 1911 it stays in service until 1986 and is still in production. It is the result of about 13 years of stepwise refinement by Browning. Its form factor (enclosing slide, grip magazine and recoil mechanics) dominate the market today. The question is, what made this and other Browning designs so successful? All the

automatic pistols at this time had similar characteristics. All with similar muzzle velocity, rates of fire and mechanical complexity. The Borchardt-Luger toggle, the Mauser and then Bergmann mechanics all fade away. In the long run, why did this form win. Here is my answer. It think it won on the reliability dimension. I think enclosing more of the machinery in the slide kept things a little cleaner. Designs also win for the little things you don't often see. I think Browning had an attention to detail at the small part level and could integrate that into the larger whole. Great designers in any field have an ability to look beyond individual specification and part details and have vision for the entire design.



#### Model Sources

Original : <https://grabcad.com/library/colt-1911-a1-model-goverment-pistol#>

Thingiverse : <https://www.thingiverse.com/download:6321267>

**32. Steyr M1912** - Sometimes referred to as the Steyr Hahn (hammerless). Military adoption of semi-auto pistols is in full swing. This is Steyr's as a follow up to the Roth-Steyr, based on the same mechanism. It gets adopted by the Austro-Hungarian Army as well as Austria, Nazi Germany, Kingdom of Italy, Italian Social Republic, Chile, Poland and Kingdom of Romania. It stays in production until 1945. At 300,000 units, it qualifies as a success. Notice how similar it, and other military pistols start following Browning form. This pistol did not have a grip inserted magazine. It was loaded from the top with a stripper clip.



Model Sources

Original : <https://3dwarehouse.sketchup.com/model/u13184411-083f-4cbe-87b5-a8bb1de0a6cf/Steyr-M1912-pistol-by-Leonmetalowiec>

Thingiverse : <https://www.thingiverse.com/download:6321269>

## Chapter 5: Variations On Themes 1912 – 1950



Like any technological cycle, after an intense period of experimentation, growth and adoption, things settle down to a few basic successful patterns. After around 1912 the same happens in this industry. John Brownings slide mechanism dominates the market and many of Lugers design elements echo.



**33. Nambu type 14** - In Japan, during the intense development period in semi-automatic pistols at the turn of the century, General Kijiro Nambu designed the original Nambu Type A. Collectors often refer to this as the 'Grandpa Nambu'. I have not been able to find a 3D model yet. The Nambu Type A outwardly resembles the Luger P08 pistol but functionally is more like the Mauser C96.



The Type B Nambu was a three-quarters sized scaled-down version of the Nambu Type A. The "Type 14 Nambu" was designed in 1925 with the goal of simplifying manufacturing to reduce cost.[8] It was officially adopted for issue to non-commissioned officers in the Japanese Army in 1927. This is the classic WWII Japanese pistol. I have included a version with the more iconic enlarged trigger guard that makes it recognizable. Later production models are distinguished this enlarged, oblong trigger guard (which was

introduced after Japanese soldiers reported difficulty in accessing the trigger while wearing gloves in Manchuria).

This story will continue with William Ruger who acquires one from a returning U.S. Marine in 1945 and takes it apart in his garage...



#### Model Sources

Original : <https://sketchfab.com/3d-models/japan-nambu-pistol-bf6e9d57719e481381ce6d6d181731e2>

Thingiverse : <https://www.thingiverse.com/download:6321289>

This model is a full 3D scan of an original Nambu from the collection of the Army Museum of South Australia.



With the enlarged trigger guard

Original : <https://gamebanana.com/models/3204>

Thingiverse : <https://www.thingiverse.com/download:6321283>

**34. TT-33** - The Soviet Union was still using the Nagant, designed in the 19th century during Tsarist times. In 1930, it was time to adopt a semi-automatic. Once again, John Browning casts a long shadow. Externally, the TT-33 is very similar to John Browning's blowback operated FN Model 1903 semiautomatic pistol, and internally it uses Browning's short recoil tilting-barrel system from the M1911 pistol.



Oddly enough, it did not fully replace the Nagant, but was used in conjunction. It was produced from 1930-1955 (1.7 million units). It was produced legally and illegally throughout the communist world.

The TT-33 is still in service in the Bangladeshi and North Korean armed forces today while police in Pakistan still commonly use the TT pistol as a sidearm,



Model Sources

Original : <https://grabcad.com/library/tokarev-tt-33-revised-version-1>

Thingiverse : <https://www.thingiverse.com/download:6321303>



**35. Walther PPK** - The PP and the PPK were among the world's first successful double action semi-automatic pistols. They are still manufactured by Walther and have been widely copied. The design inspired other pistols, among them the Soviet Makarov. They feature the recoil spring around the barrel of the Browning 1910. Other 1910 influence are lurking in the PPK and the Makarov. The original PP (Polizeipistole) was

released in 1929. Adolf Hitler shot and killed himself with his PPK in the Führerbunker in Berlin. In the fictional world this is also the preferred pistol of James Bond. Clint Eastwood carries one in "where eagles dare"



Model Sources

Original : <https://www.thingiverse.com/thing:3421763>

Thingiverse : <https://www.thingiverse.com/download:6321287>

**36. Walther P38** - The Luger, for all its iconic look and ergonomics was just too expensive to produce. Germany decides to replace it with something they can mass produce more cost effectively. The Walther P38 is that design. It actually has more parts than the Luger but requires less tolerances and is easier to manufacture. The P38 was the first locked-breech pistol to use a double-action/single-action (DA/SA) trigger. There are design elements that can be found in later pistols, the most notable being the Beretta M9. The P38 featured a visible and tactile loaded chamber indicator in the form of a metal rod that protrudes out of the top rear end of the slide when a round is present in the chamber.



The Walther P38 was in production from 1939 to 1945. After the war from 1945-1946, several thousands of pistols were assembled for the French armed forces (frequently dubbed "grey ghosts" because of parkerized finish and grey sheet metal grips). Only after 1957 was the P38 again produced for the German military. From 1957 to 1963 the P38 was again the standard sidearm.



#### Model Sources

Original : <https://www.thingiverse.com/thing:2618548>

Thingiverse : <https://www.thingiverse.com/download:6321286>



**37. Browning Hi-power** - In 1928, when the patents for the Colt Model 1911 had expired. The Browning Hi-Power was designed in response to a French military requirement for a new service pistol, the Grand Rendement (French for "High Yield"), or alternatively Grande Puissance (literally "high power"). FN commissioned John Browning to design a new military sidearm. Once again Browning casts a long shadow. He dies before the design is

finished. The design completed in 1935, it is brimming with innovation. For example, it incorporates a 'double stack' magazine, now commonly in use (Glock etc.) and gave it a 16 round capacity.

The Hi-Power is one of the most widely used military pistols in history, having been used by the armed forces of over 50 countries. After 82 years of continuous production, the Hi-Power was discontinued in 2017 by Browning Arms, but it remains in production under license.



#### Model Sources

Original : <https://www.cgtrader.com/free-3d-models/military/gun/browning-hp--2>

Thingiverse : <https://www.thingiverse.com/download:6321282>

**38. Lahti L-35** - Finland became intent on autonomously producing its own weaponry. The Finnish Army soon called for a domestically produced pistol that could withstand Finland's harsh winters. Design began in 1929 under the supervision of Aimo Lahti and a patent was granted for the M1935 Lahti pistol in 1935. Although the Lahti is outwardly similar to the P08 Luger (and shares barrel threading with same), the firing mechanism is significantly different and more closely related to the Bergmann-Bayard pistol. While not of major historical significance, I include it because I found a nice 3d model and in shows the design echo of the Luger.



#### Model Sources

Original : <https://sketchfab.com/3d-models/lahti-l-35-648ce2a210294d24bbdc60ee1c7ccbac>

Thingiverse : <https://www.thingiverse.com/download:6321291>



**39. FP - 45 Liberator** - Here is a crazy idea cooked up in 1942. Build one million single shot pistols and drop them all over occupied Europe. The project was assigned to the US Army Joint Psychological Warfare Committee and was designed for the United States Army. Two months later the design was complete and in two months (June 1942 to August 1942) one million were produced, just six months from idea to complete production.

Each gun was test fired with a few samples fired 50 times. The Liberator was shipped in a cardboard box with 10 rounds of .45 ACP ammunition, a wooden dowel to remove the empty cartridge case, and an instruction sheet in comic strip form showing how to load and fire the weapon. Each unit cost \$2.10 to make.

However, it turned out that the cost and effort to ship and air drop that many boxes was prohibitive. All the planes were being used for other things.

The real funny part is, THEY TRIED THIS AGAIN!



Model Sources

Original : <https://3dwarehouse.sketchup.com/model/c59cdecbbc341eb889172d41dca064d9/FP-45-Liberator>

Thingiverse : <https://www.thingiverse.com/download:6321288>

**40. CIA Deer Gun** - The Deer gun, developed by the CIA, was a successor to the Liberator pistol. The single-shot Deer gun was intended for distribution to South Vietnamese guerrillas as a weapon against North Vietnamese soldiers. One production run of 1,000 Deer guns was made in 1964 as an initial run, with the final cost projected as US\$3.95 per gun. The project was dropped.

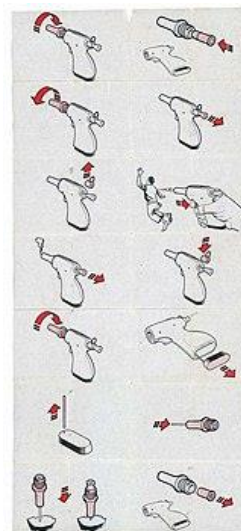
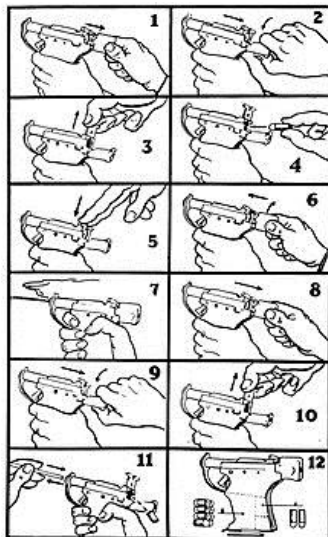


Model Sources

Original : <https://www.thingiverse.com/thing:3081128>

Thingiverse : <https://www.thingiverse.com/download:6321290>

Here are the two graphic instructions for these liberty pistols.



## Chapter 6: The Modern Era And Beyond 1950+



Much like revolvers after 1899, the semi-automatic pistol format and machinery now follow a few well-worn patterns. Competition is around materials, cost, ergonomics, reliability and safety.

**41. Ruger** - After WW II, William Ruger gets his hands on a captured Nambu Type 14 and takes it apart in his garage and duplicates it. Using the Nambu's silhouette and bolt system, Ruger produced his first prototype, but lacked the venture capital necessary to fund its introduction. When his affluent friend and potential financial backer Alex Sturm was shown the 1949 prototype Ruger had created, he was impressed by its sleek traditional aesthetic and its slight resemblance to the classic nostalgia-evoking German Luger P08 pistol.



This is a side by side comparison of the Ruger MK1 and the Nambu Type 14.

Financier Sturm, an amateur heraldry aficionado, made his own contribution in the form of the company's trademark "Red Eagle" coat of arms emblem, which was featured as a medallion on the left grip panel. A favorable review published in the American Rifleman magazine penned by the notable firearms authority Major General Julian S. Hatcher, coupled with a subdued advertisement printed in

the same magazine resulted in a great deal of interest from the public. The suggested retail price for the new pistol was a reasonable and very competitive \$37.50 US.

Checks from would-be purchasers soon rolled in, but as Ruger was firmly entrenched in the “old school” of financial responsibility, none were cashed until pistols actually shipped, setting a standard for “in the black” operation which would serve the company well in the future. In a few months the seed money was all spent, but by then the first 100 Standard pistols had been built and distributed to the initial purchasers. Ruger goes on to become a premier arms manufacturer to the civilian market. From 1949 through 2004, Ruger manufactured over 20 million firearms.

The model I found is a Ruger KMKIII6 Stainless Steel .22 Automatic Pistol with 6" Barrel



#### Model Sources

Original : <https://grabcad.com/library/ruger-kmkiii6-stainless-steel-22-automatic-pistol-with-6-barrel>

Thingiverse : <https://www.thingiverse.com/download:6321347>



#### **42. Smith & Wesson 44 magnum model 29** - I

came across this 3D model and couldn't resist. The Smith & Wesson Model 29 a beefier version of the Model 10 and was chambered for larger cartridges like the .44 magnum. In 1971, it was prominently featured in the film 'Dirty Harry' starring Clint Eastwood. In one of the classic lines in cinema, the character Harry Callahan describes his Smith & Wesson Model 29 as "the most powerful handgun in the

world". The movie posters featured the 8 3/8 inch long barrel version but the 6 1/2 inch was used for most of the filming. Demand for the Model 29 increased so much that they were selling for up to three times suggested retail price. However, after each 'Dirty Harry' movie there was a surge of sales followed by a surge in the used market.

It seemed only fitting to include this as a Clint Eastwood character carried the most powerful hand gun in the world (Colt Walker) in the movie 'The Outlaw Josey Wales'. As a side note, Eastwood carried a Colt 1851 Navy in 'The Good, The Bad And The Ugly'. He is featured in many movies with the Colt Single Action Army. In 'For a Few Dollars More', A Volcanic repeater is featured.



#### Model Sources

Original : <https://gamebanana.com/models/2636>

Thingiverse : <https://www.thingiverse.com/download:6321340>

**43. Makarov** - After World War II, the Soviet Union decides to finally phase out the Nagant revolver and the TT-33 seemed too large a side arm now that they were issuing AK-47's. Also, the Tokarev pistols omitted a safety and magazines were deemed too easy to lose. So, they held a contest and Makarov won. They began production in 1951 and it is still in production. Note, it has the recoil spring around the barrel like the Browning 1910.



Model Sources

Original : <https://grabcad.com/library/makarov-1>

Thingiverse : <https://www.thingiverse.com/download:6321344>

In the 1980's there was a sea change. The innovation center of gravity shifted from the U.S. back to Europe with the 'Wonder 9s' 9mm semi-automatics from a mix of both old and new continental players. What happened to innovation in the U.S.? Most of the major innovators (Colt, Smith & Wesson, Remington) are now shells of their former selves. They've gone through bankruptcies, change in ownership or absorbed into large holding companies. None of that is conducive to innovation and leadership. They are either being bled dry for their cash, focused on releasing old designs or simply existing from quarter to quarter. They are strong on sales and weak on invention. The military and law enforcement markets value innovation to meet goals

The Wonder 9s have stepped in to fill that void.

**44. Glock 17** - Glock is an interesting success story. Here is a good summary - <http://rdltactical.com/history-of-glock-handguns/>

Basically, Gaston Glock, who never fired a gun let alone design one, ran a methodical process to determine a set of design goals, borrow the best ideas and added a whole new approach to gun materials. Glock did, however, have extensive experience in



advanced synthetic polymers, knowledge of which was instrumental in the company's design of the first commercially successful line of pistols with a polymer frame.

Glock became aware of the Austrian Army's planned replacement of the WW II era P-38 and in 1982 assembled a team of Europe's leading handgun experts from military, police, and civilian sport-shooting circles to define the most desirable characteristics in a combat pistol. Within three months, Glock developed a working prototype that combined proven mechanisms and traits from previous pistol designs. In addition, the plan was to make extensive use of synthetic materials and modern manufacturing technologies, to make it a very cost-effective candidate.

Several samples of the 9×19mm Glock 17 (so named because it was the 17th patent procured by the company) were submitted for assessment trials in early 1982, and after passing all of the exhaustive endurance and abuse tests, the Glock emerged as the winner.

Gaston Glock credits his success in handgun design to his lack of knowledge about handguns. That gave him no preconceived notions about what a handgun should be and allowed him to focus on just a handful of requirements: ease of use, simplicity and reliability.

This complete re-think has gone on to capture 65% of the U.S. law enforcement market.



#### Model Sources

Original : <http://3dmag.org/en/market/download/item/3689/>

Thingiverse : <https://www.thingiverse.com/download:6321346>



**45. Beretta M9** - Founded in the 16th century, Beretta is the oldest active manufacturer of firearm components in the world. Beretta has been owned by the same family for almost five hundred years. In the 1980s the U.S. military decided to replace the venerable M1911A1 (after 80 years). In 1980, the Beretta 92S-1 design was chosen over entries from Colt, Smith & Wesson, Walther, the Star M28, and various Fabrique Nationale and

Heckler & Koch models.

The result, however, was challenged by the US Army, and new tests were done by the Army. In 1984, the trials started again with updated entries from Smith & Wesson, Beretta, SIG Sauer, Heckler & Koch, Walther, Steyr, and Fabrique Nationale. Beretta won this competition. The U.S. Military decided to adopt an Italian pistol (gulp). It went into service in 1990. A center of gravity shifts to Europe. However, things have not gone as well as hoped and after 25 years of service, another competition was held with different priorities. The Beretta will lose out.

Notice the open slide influence of the P-38.



#### Model Sources

Original : <http://www.cadnav.com/3d-models/model-36325.html>

Thingiverse : <https://www.thingiverse.com/download:6321339>

**46. Sig Sauer 320** - Second behind Glock in the law enforcement market is Sig Sauer. Sig Sauer is an unusual set of partnerships. Formed in 1976 as a partnership between Schweizerische Industrie Gesellschaft (SIG) of Switzerland and J.P. Sauer & Sohn of Germany. A separate company was founded in the US in 1985 with the name SIGARMS to import and distribute SIG Sauer firearms into the United States. This company was renamed SIG Sauer Inc. SIGARMS is now based in Exeter NH.



Sig Sauer has climbed to number two behind Glock in the law enforcement market.

On 19 January 2017, it was announced that the SIG Sauer P320 MHS variant had won the United States Military's Modular Handgun System trials. Modularity and standardization were now of prime importance. First units were delivered to the 101st Airborne Division (my dad's old unit) and had better accuracy and ergonomics and tighter dispersion than the M9 (Beretta). All Army units are planned to have the M9 replaced with the M17 within a decade.

There you go. The Wonder 9's now dominate U.S. law enforcement and have won the last two U.S. Military competitions.



#### Model Sources

Original : <https://3dwarehouse.sketchup.com/model/u9d950c5d-03aa-434a-bd0d-dd20698089b0/SIG-Sauer-P320-full-size>

Thingiverse : <https://www.thingiverse.com/download:6321341>



**47. Desert Eagle** - In a world where sometimes bigger is better, the Desert Eagle is a semi-automatic handgun notable for chambering the largest centerfire cartridge of any magazine-fed, self-load pistol. It can fire a .50 caliber round and have a range of 200 meters. It is also unique in that its systems are highly modular. You can change calibers by changing parts (the barrel, bolt assembly, and magazine).

The Desert Eagle uses a gas-operated mechanism normally found in rifles, as opposed to the short recoil or blow-back designs most commonly seen in semi-automatic pistols. This is a very notable exception and departure from the standard mechanisms. When a round is fired, gases are ported out through a small hole in the barrel near the breech. These travel forward through a small tube under the barrel, to a cylinder near the front of the barrel to cycle the next round. This lets it fire the more powerful ammunition.

The Desert Eagle has been featured in more than 500 films, Television films and video games making it well known in popular culture. The commercial success of the pistol is due in part to its use in motion pictures, according to its maker, Magnum Research.



#### Model Sources

[https://3dwarehouse.sketchup.com/model/](https://3dwarehouse.sketchup.com/model/d81bac8b449807bab7b81b671e901c39/Desert-Eagle-50AE-DETAILED)

d81bac8b449807bab7b81b671e901c39/Desert-Eagle-50AE-DETAILED

Thingiverse : <https://www.thingiverse.com/download:6321343>

**48. Phaser** - In the 23rd century, side arms are 'direct energy' weapons. They have multiple settings from stun to obliterate.

Phaser technology used by Starfleet was preceded by phase-modulated particle weapons in the mid-22nd century, including such weapons as the hand-held phase-pistol and ship-mounted phase cannon. Laser weapons, such as the laser pistol, were also used before phasers became the standard-issue weapon in the Starfleet arsenal.



Phaser weaponry was invented during the 23rd century. The technology was used by Starfleet as early as 2233; the USS Kelvin was equipped with ship-mounted phaser banks. Phaser rifles were used as early as 2265, although at that time officers were still armed with laser pistols. On Deneb V, in 2268, death by phaser was one method of execution for those who were given the death penalty.



#### Model Sources

Original : <http://3dmag.org/en/market/download/item/3257/>

Thingiverse : <https://www.thingiverse.com/download:6321342>

48 labeled entries + 2 Smith & Wesson Model 10's + 2 Lefausheux's + 2 Nambu's = 51 3D models.

## About The Models And Prints.

Here are more details on the models, the printing and the painting.

### Printer



My printer is a da Vinci Jr Pro from XYZ printing. It's a very low end. You can pick one up from Amazon for \$289 -

<https://www.amazon.com/Filament-Printer-6-Enclosed-Maintenance-Antibacterial/dp/B01MUBKPFC> . I have nothing to compare it, but for an entry level toy, I've been very happy. It does have its quirks. I can use XYZprinting's filament or any of the others on the market.

### Model sources

As I mentioned, my goal was to assemble this collection with 3D models that were freely available. I discovered that many very talented artists make their work available. I want to make sure that everyone is properly credited so I have the links to all the original model sources. I also discovered that there is an industry of 3D models for purchase. Here is a list of some of my sources:

Thingiverse - <https://www.thingiverse.com/>

GrabCad - <https://grabcad.com/library>

SketchFab - <https://sketchfab.com/feed>

3D Warehouse - <https://3dwarehouse.sketchup.com/>

STLfinder - <https://www.stlfinder.com/>

CadNav - <http://www.cadnav.com/>

Yeggi - <https://www.yeggi.com/>

Deviant Art - <https://www.deviantart.com/>

Game Banana - <http://gamebanana.com/>

Art Station - <https://www.artstation.com/> (nice renderings but usually no models)

Some of the pay sites will have an occasional free model

CGTrader - <https://www.cgtrader.com/>

TURBOSQUID - <https://www.turbosquid.com/>

Hum3D - <https://hum3d.com/>

I found that if I simply added '3D' to the Google search for model I was looking for and looked at image search results, that was a good starting point.

The models would come in a variety of formats and scales. I decided to get everything to a .STL format. And at the same scale. I built up a collection of free tools to help me with these conversions. I came across this great utility from Microsoft that repairs bad .STL files.

<https://tools3d.azurewebsites.net/>

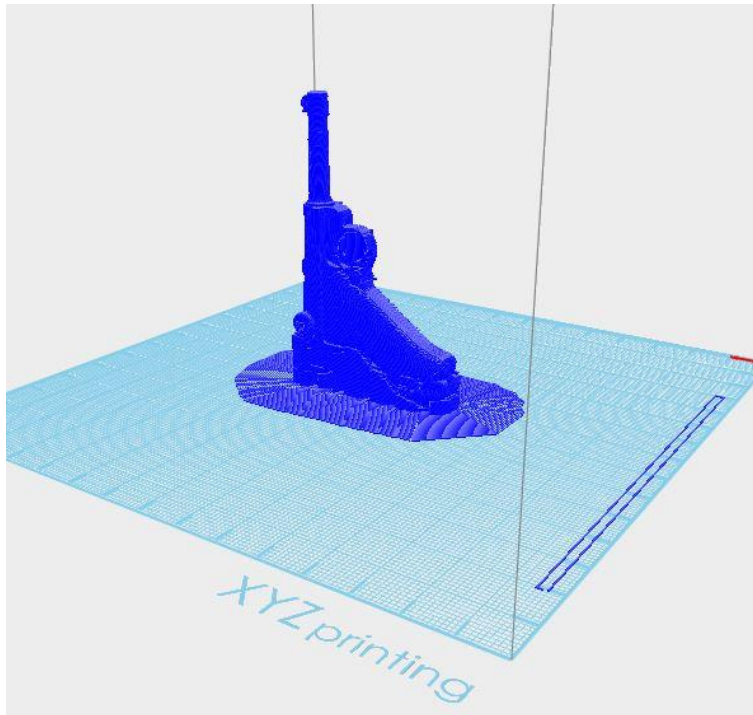
Most of the time, Blender could handle the conversion. I would use MeshMixer to remove backgrounds and other objects.

## Print parameters

After many mangled hammers, triggers and trigger guards, I worked out my print process. I still get surface flaws but I minimize them to the rear of the model.

The da Vinci printer comes with its own slicer. I have not yet played around with the other ones out there. Here are my preferred settings:

- Flip the model vertically, barrel up and orient it back to front to minimize tipping issues.
- .1mm resolution
- 0% infill
- Brim. I make that 20mm as I had a few slide around with less
- The XYZ tool has a 'follow contour' support type. I also set the threshold angle above 70 degrees



## Painting

I have attempted to paint many of the models. I am using acrylic paints and a steady hand. I haven't really found a color combination that I am happy with. Gloss black is too shiny and a flat black looks too chalky. I've tried others but nothing sings to me yet. Any advice would be greatly appreciated.

## Scaling

I have scaled all the models to .318. I know that's an odd scaling factor. All the models will fit in a 6 inch cube print area.

Why .318? Well, I downloaded my first model, a Luger P08 and only wanted to print a small one. I set the length to 70mm. I downloaded and printed another one and wanted them to be at the same scale. That worked out to .318. Before I knew it and not wanting to go back and reprint anything, I settled on this scaling factor. You can divide any dimension by .318 and get to actual size. The models came in all over the map. Some were very small, some were actual size, and some were 10X. If you think my math is off, you can go to source files from the links and download the originals. Most of the time Wikipedia provides dimensions, most of the time.

So, like most standards, its origins are driven by historical issues more than anything else.

## Models I Am Still Looking For

### **Smith and Wesson Model 1 or Model 2**

[https://en.wikipedia.org/wiki/Smith\\_%26\\_Wesson\\_Model\\_1](https://en.wikipedia.org/wiki/Smith_%26_Wesson_Model_1)  
[https://en.wikipedia.org/wiki/Smith\\_%26\\_Wesson\\_Model\\_2](https://en.wikipedia.org/wiki/Smith_%26_Wesson_Model_2)  
<https://www.deviantart.com/charliedeft/art/Smith-and-Wesson-Model-1-Second-Issue-rerender-382030670>  
<https://www.deviantart.com/charliedeft/art/Smith-and-Wesson-Model-1-Second-Issue-HiRes-Tex-382031103>  
<https://www.deviantart.com/charliedeft/art/Smith-and-Wesson-Model-1-Wireframe-355952701>  
<https://www.deviantart.com/cungya/art/Smith-Wesson-revolver-Model-2-HLebooks-com-537893850>  
<http://www.hlebooks.com/ebook/swtipEN.htm>

### **Roth-Steyr**

[https://en.wikipedia.org/wiki/Roth%E2%80%93Steyr\\_M1907](https://en.wikipedia.org/wiki/Roth%E2%80%93Steyr_M1907)  
<https://www.deviantart.com/portugueseotaku/art/Deadfall-Adventures-Roth-Steyr-M1907-655163446>

### **Browning 1910**

[https://en.wikipedia.org/wiki/FN\\_Model\\_1910](https://en.wikipedia.org/wiki/FN_Model_1910)  
<https://www.artstation.com/artwork/9rBPW>  
<https://www.artstation.com/artwork/obA9k>

### **Collier Flintlock**

<https://www.turbosquid.com/3d-models/1820-coller-flintlock-revolver-3d-max/732549>  
<https://www.artstation.com/artwork/2wxxK>  
<https://jonasheberer.artstation.com/projects/2wxxK>

### **Schoenberger-Laumann**

[https://en.wikipedia.org/wiki/Sch%C3%B6nberger-Laumann\\_1892](https://en.wikipedia.org/wiki/Sch%C3%B6nberger-Laumann_1892)  
[https://www.icollector.com/EXTREMELY-RARE-SCHOENBERGER-LAUMANN-STEYR-M1892\\_i17332851](https://www.icollector.com/EXTREMELY-RARE-SCHOENBERGER-LAUMANN-STEYR-M1892_i17332851)  
<https://www.forgottenweapons.com/laumann-1891-and-schonberger-laumann-1894-semiauto-pistols/>

### **Salvator Dormus**

[https://en.wikipedia.org/wiki/Salvator\\_Dormus\\_pistol](https://en.wikipedia.org/wiki/Salvator_Dormus_pistol)  
<https://www.youtube.com/watch?v=QGzb-0PJadI>  
[https://guns.fandom.com/wiki/Salvator-Dormus\\_1891](https://guns.fandom.com/wiki/Salvator-Dormus_1891)

### **Grandpa NAMBU - not as important, different than the NAMBU Type 14**

<https://www.nambuworld.com/grandpagallery.htm>  
<https://www.rockislandauction.com/detail/72/2638/tokyo-gas-electric-1902-grandpa-nambu-pistol>

### **Webley Fosbery**

[https://en.wikipedia.org/wiki/Webley%E2%80%93Fosbery\\_Automatic\\_Revolver](https://en.wikipedia.org/wiki/Webley%E2%80%93Fosbery_Automatic_Revolver)

<https://www.artstation.com/artwork/IE58O>  
<https://sketchfab.com/3d-models/pathologic-2016-webley-revolver-77a51f5de729470ea3d9769ea6e04c6a>  
<https://www.cgtrader.com/gallery/project/webley-fosbery-automatic-revolver>

### **Webley Auto 1913**

[https://en.wikipedia.org/wiki/Webley\\_Self-Loading\\_Pistol](https://en.wikipedia.org/wiki/Webley_Self-Loading_Pistol)  
<https://www.cgtrader.com/3d-models/military/gun/webley-1913>  
<https://www.artstation.com/artwork/yxO6K>

### **Enfield Revolver**

[https://en.wikipedia.org/wiki/Enfield\\_No.\\_2](https://en.wikipedia.org/wiki/Enfield_No._2)  
<https://3dexport.com/3dmodel-enfield-no-2-mk-i-73599.htm>  
<https://www.cgtrader.com/3d-models/military/gun/enfield-no-2-mk-i>  
<https://3dexport.com/3dmodel-enfield-no-2-118757.htm>