

The patent drawing for Dr. Richard Gatling's "Machine Gun", U.S. Patent No. 36,836 of November 4, 1862.

# The Development of The Gatling Gun

Roy M. Marcot

In the latter half of the 19th Century, the Gatling gun was the most feared of battle weapons. This remarkable gun offered awesome firepower to battlefield commanders and ship's captains alike. It was simple to use, and a single Gatling gun could produce destructive power equal to that of hundreds of soldiers armed with conventional rifles. When used aboard warships, this weapon could rake the decks of enemy ships, dispelling any thought of boarding by enemy sailors.

Although the Gatling gun is relatively well known in modern times, little has been published about the prototype guns, or about the early relationship between Dr. Gatling and the Colt factory.

Like Christopher Miner Spencer and Colonel Hiram Berdan, Richard Jordan Gatling was an inventive genius during the golden age of breechloading firearms development. Richard Gatling's first inventions had commercial applications, not military ones. In the 1830s and 40s, Gatling invented such devices as propeller screws for steamships, seed sowing machines, and wheat planting tools, although none proved to be a financial success.

With medical training that defies substantiation, Richard Gatling became a medical practitioner in the late 1840s. In addition to treating patients, Dr. Gatling continued to invent machinery to improve productivity. Patent office records illustrate the products of his active mind: in 1847 he invented a hemp beating device, and two years later he developed systems to pipe compressed air. In 1857, he invented a steam-powered farm plow, followed in 1860 by patents on cotton plant cultivators, lath-making machines, and rubber washers for tightening gears. All of these would pale in the light of the weapons system he would invent a few years later in response to America's greatest calamity, the War Between the States.

The intense competition of war provides stimulation for inventive genius, and the Civil War provided a fertile environment for inventors of breechloading firearms of every size, shape and description; metallic, self-primed ammunition; iron-clad ships; observation balloons; and cannon of immense proportions. Technology advanced in quick-step to enhance destructive power that could bring to bear upon the enemy.



Doctor Gatling, a resident of Indianapolis, Indiana, was encouraged by a friend, Colonel Benjamin Harrison (later President of the United States), to turn his inventive ability toward weapons of war. Gatling developed what he would call his "battery gun." In his own words, Gatling would later say:<sup>1</sup>

It occurred to me that if I could invent a machine, a gun, which could by its rapidity of fire, enable one man to do as much battle duty as a hundred, that it would, to a great extent, supersede the necessity for large armies...

Gatling's initial design of a multi-barreled firearm came about in the summer of 1861, not three months after war was declared. Proceeding from concept to paper, to functional model, and then to a crude working arm took nearly six months. In the spring of 1862, Gatling's functional prototype weapon was demonstrated in Indianapolis. He was awarded U.S. Patent #36,836 on November 4, 1862, for "An Improvement in Revolving Battery-Guns."

The patentable features claimed by Gatling included a lock cylinder which revolved with the barrels, and a separate firing pin (a striker) for each barrel. Gatling's earliest gun consisted of six rifled barrels which revolved around an axis, and a brass hopper which would be filled with several dozen loaded chambers. These steel chambers were fitted with a nipple on one end, to which a standard musket cap could be affixed. A Minie ball and black powder were loaded into the opposite end of each chamber.

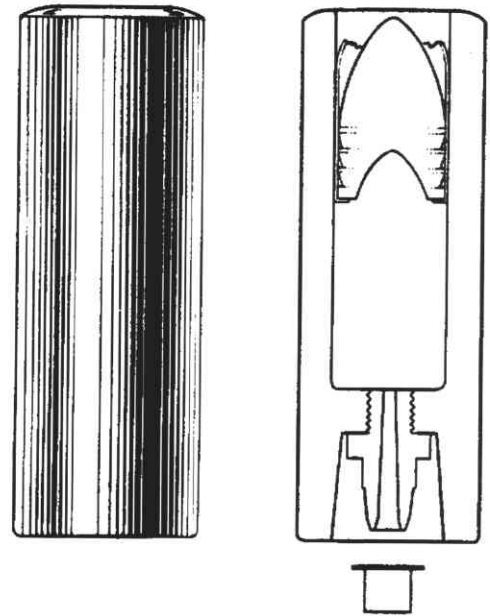


**Richard Jordan Gatling, Medical Doctor and Inventor, 1818-1903.**

When the handle on the right side of the Gatling gun was cranked in a clockwise direction, a loaded chamber would fall by gravity through a loading trough. The chamber was immediately pushed up tightly against the barrel on one side and against the striker assembly on the other side. All six barrels, with corresponding striker assemblies, were rotated into a firing position at 4 o'clock. As each chamber was loosened from the fit against the barrel, it fell into a waiting container. After firing, each chamber could be cleaned and reloaded.

As the handle of the gun was rotated one revolution, six shots were fired. Ten revolutions yielded 60 shots, and so on until all chambers in the hopper were expended. The cyclic rate of fire of Dr. Gatling's first .58 caliber "battery-guns" was a staggering "200 rounds a minute," barring mechanical failure or overheating of the barrels.

The major shortcoming of Gatling's first design was gas leakage. He was able to remedy this by designing a wedge into the breech casing, so that as the chamber was to be fired, it would be pushed more tightly into the seat at the end of the barrel. However, it became evident that while the gas leakage problem was reduced significantly with the addition of the wedge, the effort that it took for the operator to turn the crank handle of this design was considerable. The problem was finally corrected when Gatling later changed from loaded chambers to fixed metallic ammunition.



**This Herschel Logan drawing accurately depicts one of the original Gatling gun's steel, reloadable chambers. Note the standard percussion nipple and cap on one end, and the .58 caliber Minie ball and black powder paper cartridge in the other. From *Cartridges*, page 49.**

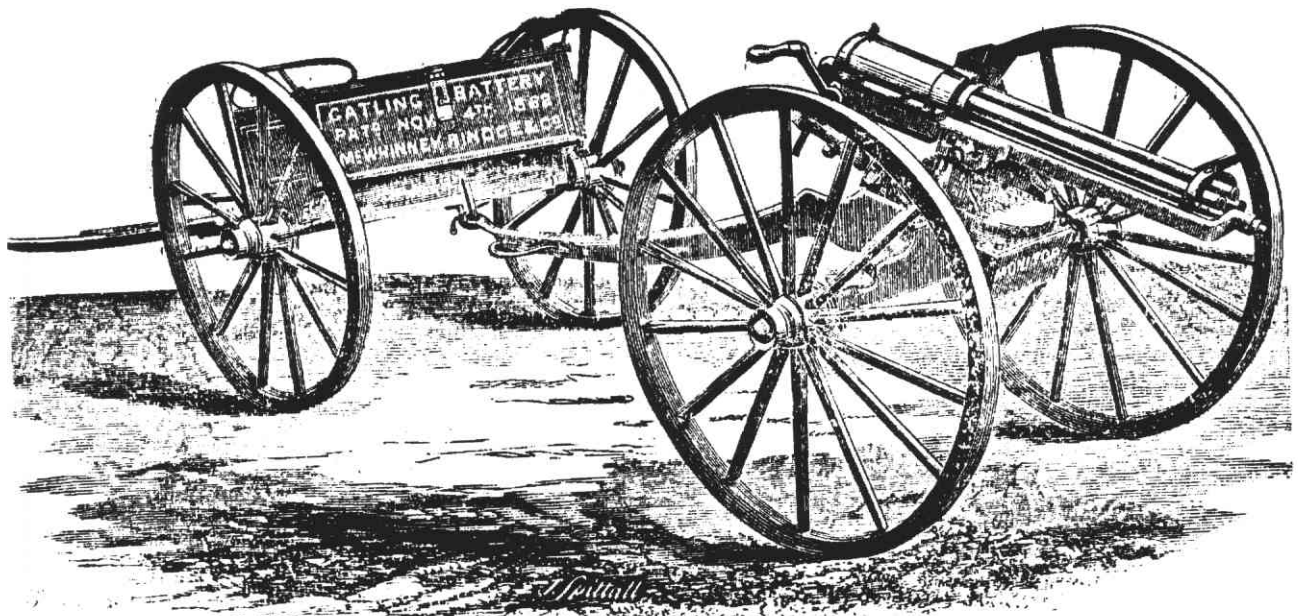
#### INITIAL ORDNANCE TRIALS

Governor O.P. Morton of Indiana ordered a trial of Gatling's "improved" gun with the wedge design in July, 1862, and was impressed with this revolutionary firearm. A few months later, the governor wrote the following to the Assistant Secretary of War in Washington: <sup>2</sup>

Allow me to call your attention to the Gatling gun, invented by Dr. R.J. Gatling of this city. I have been present at several trials of this gun... and am of the opinion that it is a valuable and useful arm. Dr. Gatling desires to bring it to the notice of your department, with the view of having it introduced into the service.

Unfortunately for Dr. Gatling, Governor Morton's letter was but one of thousands that were sent to various federal officials in Washington, D.C., stating that this invention, or that, should be adopted by the Ordnance Department. The Governor's letter, like nearly all of the others, went unanswered.

In 1863, after receiving a much-needed infusion of capital from private investors, Dr. Gatling contracted with Miles H. Greenwood & Company of Cincinnati, Ohio, to make the first six production Gatling guns at their Eagle Iron Works facility. Tragedy struck when the guns were nearing completion, when the manufacturing facility was destroyed by fire. Lost, too, were most of Gatling's plans, shop drawings and preliminary models. Confederate saboteurs would always be suspected, but this was never proven.



## GATLING BATTERY.

**This drawing is the earliest known depiction of the "improved model" Gatling gun from the Civil War, Gatling's six-barrel repeating gun which used reloadable steel chambers, each holding a .58 rimfire cartridge. From a previously unpublished broadside in the author's collection.**

Undaunted, Dr. Gatling sought and received further financial assistance from Cincinnati-based McWhinney, Rindge & Company. Together, they convinced the Cincinnati Type Foundry Works to commence construction of thirteen new Gatling guns. In the late spring of 1863, all thirteen Gatling guns were shipped to Baltimore.

One of these guns was transported south to the U.S. Naval Yard in Washington, D.C., and tested by the Bureau of Ordnance in May, passing all preliminary tests.<sup>3</sup> Acting on a suggestion from the Commander of the Naval Yard, Gatling modified a set of Gatling gun barrels and shipped them to Washington to be fitted to the existing gun in time for the new Naval trials in July 1863. The results of these trials were acceptable, and Admiral Dahlgren gave official permission to all interested commanders to order Gatling guns for their ships.<sup>4</sup>

Hoping for an immediate firm order, Dr. Gatling wrote to Admiral David Porter on August 25, 1863, and mentioned that more of his guns would soon be available. Gatling went on to say that the guns, complete with appendages and mounted for service, would cost \$1,000 apiece. Porter ordered only one gun for his Mississippi Squadron, for trial under battle conditions.<sup>5</sup>

Mr. Rindge, Gatling's business partner, met with officials of the Army Ordnance Department in the summer of 1863, but they informed him that the Army had no interest in Gatling's complicated and unproven weapon. Discouraged, Rindge went to Baltimore and,

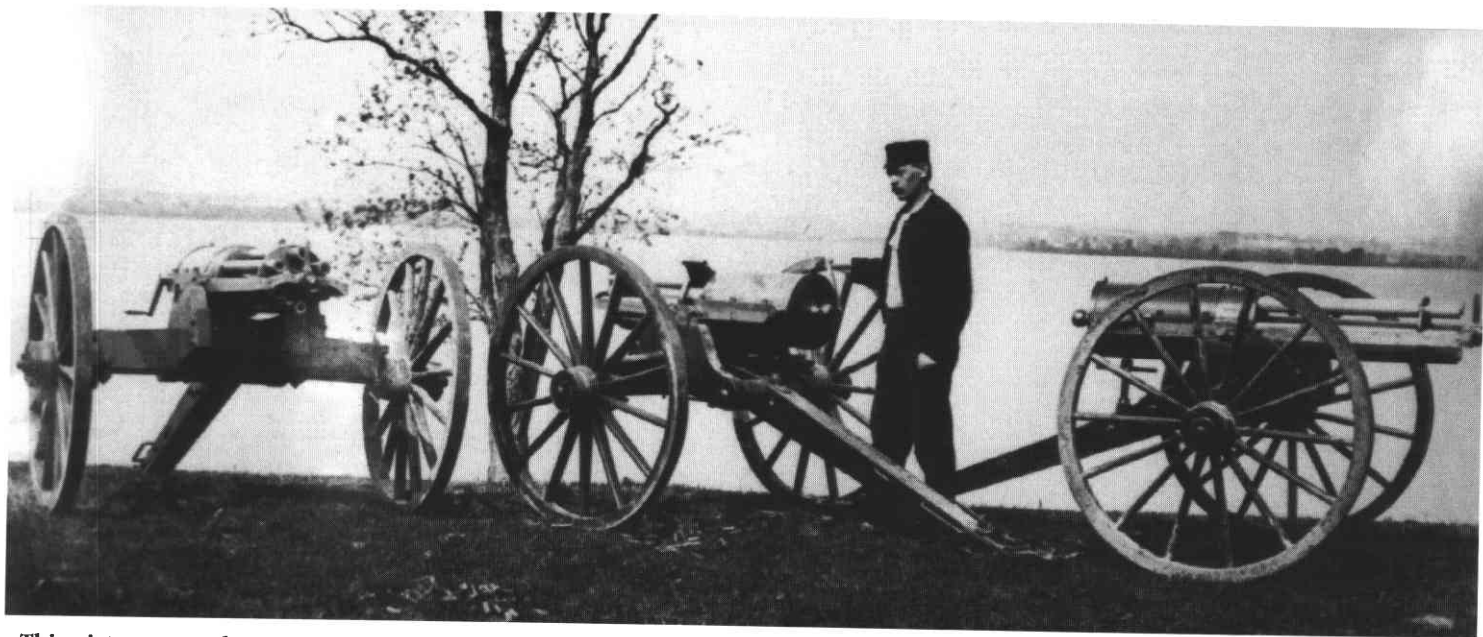
luckily, was given the opportunity to demonstrate the Gatling gun to Union General Benjamin Butler. The General was so impressed with the firepower that was demonstrated to him that he wrote Rindge a personal check for \$12,000 to cover the cost of a dozen Gatling guns, twelve carriages, limbers, and a supply of steel chargers. General Butler took the dozen guns Rindge sold him, used two of them at the Battle of Petersburg, and others on river gunboats.

Rindge did not deliver Butler's \$12,000 to Gatling, but co-mingled the funds with his personal assets. Rindge lost not only Gatling's money, but his own personal fortune in the untimely failure of his Chicago-based pork factory. Thus, Gatling suffered another financial loss, which was compounded by the reluctance of potential buyers to purchase this weapon in quantity. However, Gatling's failure to secure sizeable orders for his guns during the Civil War was a result not only of the Ordnance Department's distrust of complicated firearms, but also a result of his perceived political leanings. It was alleged that Gatling was a "Copperhead," a citizen who lived in the North, but opposed the war. Although there were allegations that Gatling had sent one of his guns to the South, it was never proven that he harbored sympathy for the Confederate Cause.

### USE OF THE GATLING GUN DURING THE WAR

One of the most significant events of the war that took place away from the battlefield was the New York





**This picture was taken at Fort Monroe Arsenal, Virginia, in late June, 1866. It shows three new one-inch Gatling guns which were tested by Ordnance Captain T.G. Baylor. Note the cartridge cases on the ground. Photo courtesy West Point Museum.**

City Draft Riot of July 13-16, 1863. Fearful of the newly-adopted Conscription Act, nearly 50,000 protestors rampaged through the city and destroyed nearly \$2,000,000 in property. At least a thousand people were killed during this four day melée. Anticipating violence against its newspaper for reporting the mob actions, the *New York Times* made its prominent building a fortress against the rioters. Nearly every worker was armed with a rifle, and three recently-acquired Gatling guns were employed along likely avenues of approach. This defense was ample to dissuade the rioters from attacking. The Gatling guns did their job without firing a shot. This would not be the last time that the presence of a Gatling gun would discourage an enemy from attacking.

In May, 1864, after being defeated by Confederate General Beauregard's much smaller force, General Benjamin Butler retreated to the Bermuda Hundred, north of Petersburg, Virginia. It was here that Butler's men waited until General Grant advanced upon Petersburg in June. It was also the first historically recorded use of a Gatling gun in battle, although the action was not very eventful. Evidently, General Butler placed several guns at the Federal breastworks, but they were only fired at some unsuspecting Confederate soldiers during a lull in the fighting.<sup>6</sup> There is no recorded use of Admiral Porter's one Gatling gun with the Mississippi Flotilla during the war. The most significant war of the 19th Century should have been the proving ground for the Gatling gun, but it was not. What may have been the most important development in firepower remained untried and

unproven.

#### METALLIC AMMUNITION FOR THE GATLING GUN

Gatling improved his repeater in 1864 by adapting the gun to fire rimfire ammunition. The original chambers were altered by removing the percussion nipple, and reaming the end to seat a .58 caliber, copper-cased, rimfire cartridge. The new chamber allowed for quicker reloading of the chambers, but did not eliminate the problem of gas leakage at the juncture of the chamber mouth and the barrel. This improved design was illustrated in the earliest known Gatling gun broadside, which dates from 1864:<sup>7</sup>

Two hundred cast steel chargers, three inches in length, accompany each gun, for the reception of the cartridges of fixed ammunition (copper cartridges). The chargers are placed in cases of 25 or more, and passed through a hopper...

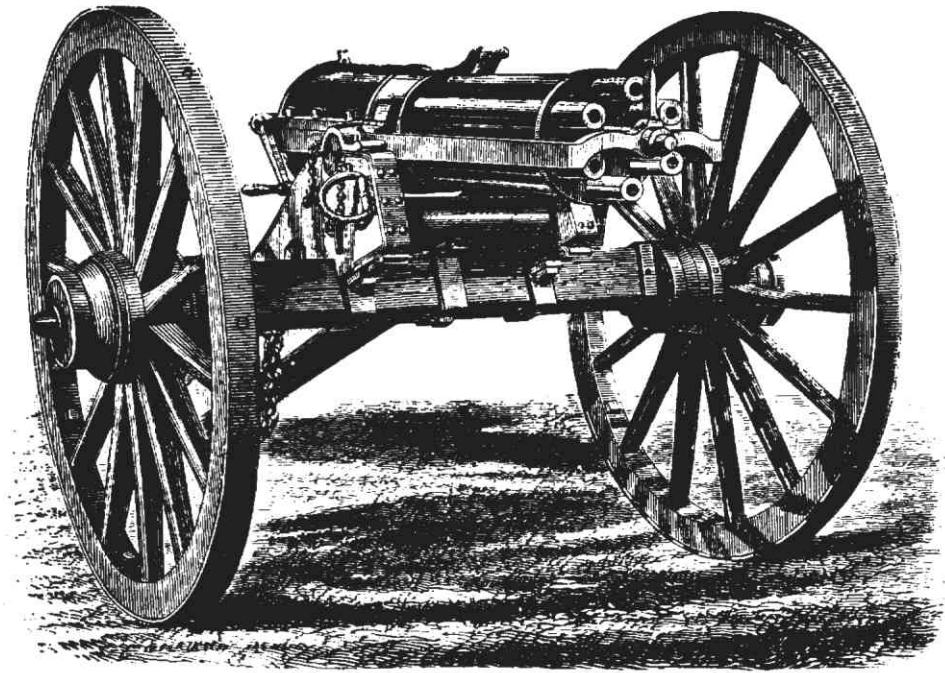
The rapidity of discharge is entirely under the control of the operator, and any number from one up to 200 per minute, at a range of a mile to a mile and a quarter, with as much accuracy as with a rifle...

Five to eight men only are required to operate it, to its full capacity in action, and no infantry are required to support it...

For field service, these guns are mounted similar to light artillery, to be drawn by one or more horses. The weight being about 1,000 pounds, can be handled by men in action with great rapidity, when necessary...

These guns will be found well adapted as support to large batteries, in case of a charge being made on them, or as accompaniment to cavalry moving rapidly. It would be invaluable in guarding railroad bridges, supply trains, emigrant trains crossing the plains, or in Indian warfare.

Although he was discouraged by the lack of interest in his revolutionary gun, Richard Gatling continued to



An engraving of Gatling's 1-inch gun, fixed to a carriage allowing no lateral movement.

improve the weapon's reliability and functioning. A new Gatling gun (reported to be 4-barrel, but not substantiated in any reference) was tested at the Washington Arsenal on January 20, 1865. While the detailed report prepared by Ordnance Lieutenant I.W. Maclay did not mention caliber, it may be assumed that this was the first Gatling gun designed to fire .58 caliber rimfire ammunition without the use of steel carriers. The advantage of this over earlier guns was obvious: the cartridge itself would be seated in the barrel before firing, eliminating the gas-leakage problem inherent when using loaded chambers. Lieutenant Maclay's report went on:<sup>8</sup>

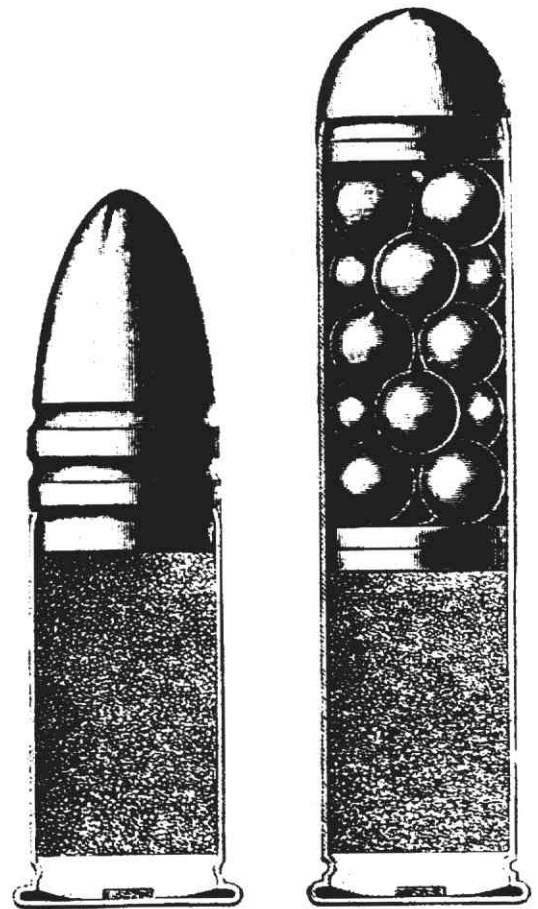
The cartridges are placed in tin cases which will contain twenty cartridges, their cap ends in one direction. The tin case, or feeder, is then inserted in the hopper, and as the gun rotates, the cartridges drop one by one into the grooves of the carrier, and are shoved into the barrel by the lock.

The gun was fired for accuracy with 20 rounds each at 100, 300 and 500 yards. Then the gun was fired for rapidity, and after 220 rounds, barrel No.2 burst. The trial continued with firing through the remaining barrels.

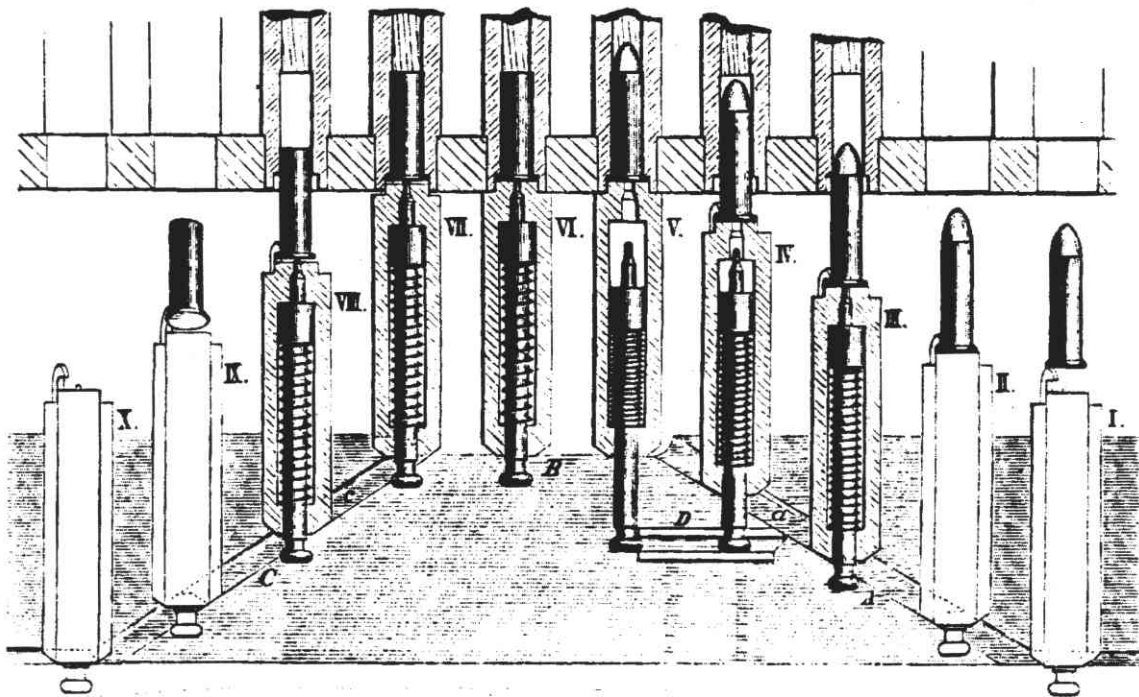
To these, I report that the gun certainly possesses the advantages of rapidity and accuracy. There is no escape of gas, but like all firearms, there is recoil. It has one lock for each barrel, so that in the event of one barrel or lock being disabled, the gun is still sufficient. [sic. Operable?]

The objections that I find with this arm are:

- 1st There is no sufficient preponderance. [sic.??]
- 2nd There is too much twist to the rifling, and the grooves are too shallow.
- 3rd The rear sight is not adapted for this gun.
- 4th The carriage might be made lighter, and the frame and trunions heavier.



These centerfire cartridges were specifically made for the one-inch Gatling gun at Frankford Arsenal in 1866 and 1867. The cartridge on the left has an eight ounce lead bullet and three-fourths ounce of black powder. That on the right, has a short half-ounce bullet and fifteen .50 calibre round lead balls.



**This drawing shows the movement of a .50-70 cartridge as it is fed, fired, extracted, and ejected from a six-barrelled Gatling gun, going from right to left.**

#### MODEL 1865 GATLING GUNS

Lieutenant Maclay's report was forwarded to the Chief of Ordnance by Lieutenant Stockton, who witnessed the trial and reported:<sup>8</sup>

Gatling's gun seems to possess all the good qualities claimed for it. It is, therefore, merely a question of whether such a piece would be of use in actual service.

The Chief of Ordnance, General Alexander B. Dyer, approved of the trial, but suggested that Gatling design a gun to take a one inch diameter cartridge. Under Dr. Gatling's direction, eight one-inch Gatling guns were built for the government in Philadelphia at the Cooper Fire Arms Manufacturing Company. Dr. Gatling's new partners were officials of the firm of Talbot, Jones & Company, of Indianapolis. Frankford Arsenal was charged with developing and manufacturing several thousand Gatling gun one-inch centerfire cartridges, in both solid bullet and "buckshot" loads.<sup>9</sup>

The first of the one-inch guns was ready for trial in March, 1866. Lieutenant Colonel D. H. Beul, a Frankford Arsenal Ordnance Officer, tested the first smooth-bore 1-inch Gatling gun on March 16th. The results were so successful that when the next three guns were ready, they were sent to Washington D.C. for firepower exhibitions for important commanders and influential politicians. Civil War hero Major General Winfield Scott Hancock ordered a dozen guns for his Corps.

The results of additional trials held at Fort Monroe in July, 1866, convinced the Ordnance Department to

adopt the Gatling gun as an artillery piece to augment the cannon. On August 24, 1866, fifty Gatling guns chambered for the recently adopted 50-70 centerfire rifle cartridge, and another 50 one-inch Gatlings were ordered by the Ordnance Department. This was the first sizeable contract ever awarded to Gatling, and it was clear that he needed to engage a large, fully-equipped armory to make the one hundred guns.

#### COLT'S FACTORY MAKES THE GATLING GUN

Colt's Armory in Hartford, Connecticut, suffered as did all other arms-producing plants in post-war America in 1866. Many arms manufacturers, such as the Spencer Repeating Rifle Company, never recovered. The transition to a peacetime economy meant that private armories needed to secure contracts that would keep their employees working, and generate revenue to pay off the enormous debt that they had underwritten to build their factories during the war. As America's largest private armory, Colt's accepted work from nearly any source, including a Doctor from Indianapolis, who approached them with a signed contract worth more than \$175,000!<sup>10</sup> William B. Franklin, Vice President and General Manager of the Colt factory, was pleased with the large contract from Gatling, which also had the promise of future orders to come.

Re-tooling machines, ordering materials, and training workers was an enormous task for Colt's Armory, but by January, 1867, not five months after the Army contract was awarded, the first Gatling gun was ready for

proving and inspection.<sup>11</sup> It would take many more months for the remaining guns to be made, because of the numerous improvements that were ordered by Dr. Gatling and by various ordnance officials. However, all 100 Gatling guns were delivered by August 23, 1867.<sup>10</sup>

General Franklin's decision to manufacture guns for Dr. Gatling began to take on new importance when ordnance officials from other countries observed the trials of the gun. By June, 1867, Gatling and his partners, Talbot, Jones & Company, had secured initial orders from Japan, Switzerland, and Prussia, with more firepower exhibitions scheduled to be held.

Under constant improvement, Dr. Gatling's guns promised unparalleled firepower for battlefield and naval commanders. Gatling guns held the lead in firepower for

three decades, until overtaken by the machine guns of Maxim, Vickers and Browning. These new inventions did not rely upon the cranking power of a soldier to function, but were true "automatic" machine guns.

It was not until an electric motor was attached to a Gatling gun in 1890, that an unheard-of rate of fire of 1,500 rounds per minute was achieved.<sup>12</sup> Unfortunately, neither the company nor the Ordnance Department capitalized upon this opportunity, and it was not until 1945 that the Army continued experiments with a motor-driven 1883 Gatling gun. The result was the now-famous Vulcan and Phalanx rapid-fire weapons still in use today. Dr. Gatling would have been proud.

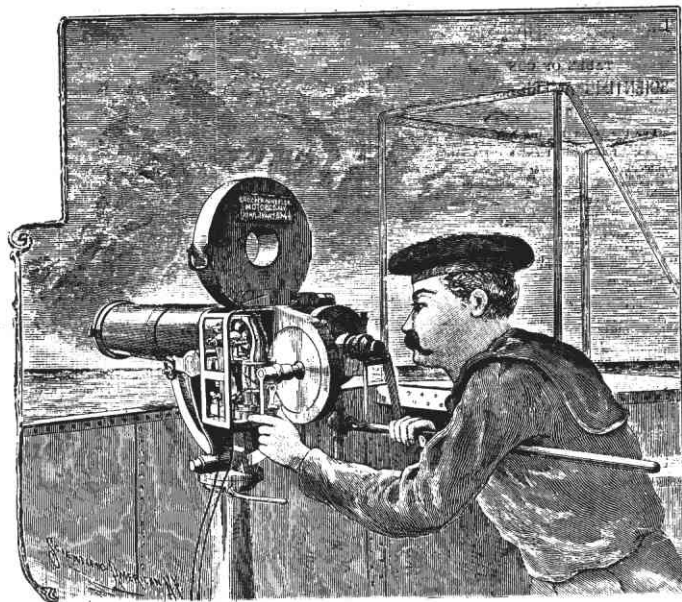
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#### NOTES

1. Private letter from Dr. R.J. Gatling to Miss Lizzie Jarvis, dated June 15, 1877.
2. Letter from Governor O.P. Morton of Indiana to Assistant Secretary of War P.H. Watson, dated December 2, 1862.
3. The *Hartford Times* newspaper, dated February 27, 1903. Obituary of R.J. Gatling.
4. Letter from Lieutenant Commander J.S. Sherreth, U.S. Navy Yard, to Rear Admiral John A. Dahlgren, dated May 20, 1863.
5. Unpublished memoirs of Captain Gustavus S. Dana, Signal Corps, when attached to the Staff of Major General Quincey Gilmore, X Corps, Army of the James.
6. Letter from R.J. Gatling to Admiral Porter, dated August 25, 1863.
7. Company broadside illustrating the functioning of the "Improved Gatling Battery Gun," distributed by McWhinny, Rindge & Co., Proprietors. Circa 1864. (Author's collection)
8. Army Ordnance Report: Experiment with cannon (Class I), by Lieutenant I.W. Maclay, 1st Artillery, at the Washington Arsenal, January 20, 1865.
9. Letters from R.J. Gatling to Colonel S.V. Benet, Commanding Frankford Arsenal, from October 2, 1865 to April 23, 1866.
10. Contracts by the Ordnance Department. General A.B. Dyer, dated January 7, 1868:
  - Fifty .5" Gatling guns at \$1,500 each.
  - Fifty 1-inch Gatlings at \$2,000 each.
  - Including carriages and appendages.
  - Total.....\$178,057
11. Letter from Ordnance Inspector Colonel J.M. McAllister, N.Y. Agency, to Colonel S.V. Benet, Commander of Frankford Arsenal, dated January 31, 1867.
12. *Scientific American*, dated November 15, 1890. "Firing Gatling Guns by Electricity."

#### REFERENCES

- National Archives of the United States, Washington, D.C.  
 Military Records Department  
 Record Group 56: Records of the Navy Bureau of Ordnance.  
 Record Group 156: Records of the Army Ordnance Department.  
 Connecticut State Library, Hartford, Connecticut.  
 Record Group 103: Records of Colt's Patent Fire Arms Mfg. Company. Sub-group 12: Gatling Gun Company.  
 Logan, Herschel C., *Cartridges*. Harrisburg, Pa., The Stackpole Co., 1959.  
 Wahl, Paul, and Toppel, Donald, *The Gatling Gun*. London, Herbert Jenkins, 1966 (from which all unattributed illustrations were taken, with thanks).



**In 1890, an electric motor was attached to a M1883 Gatling gun. It produced over 1,500 rounds per minute!**

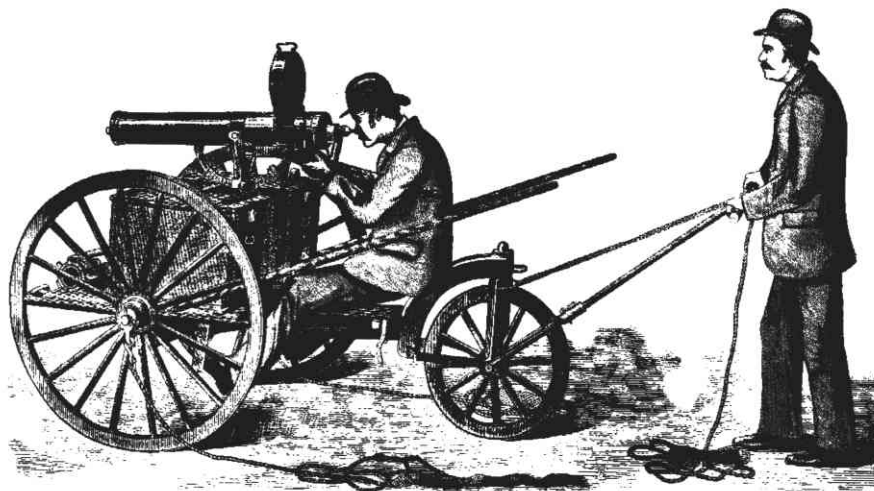


## Gatling Guns for the U.S. Military

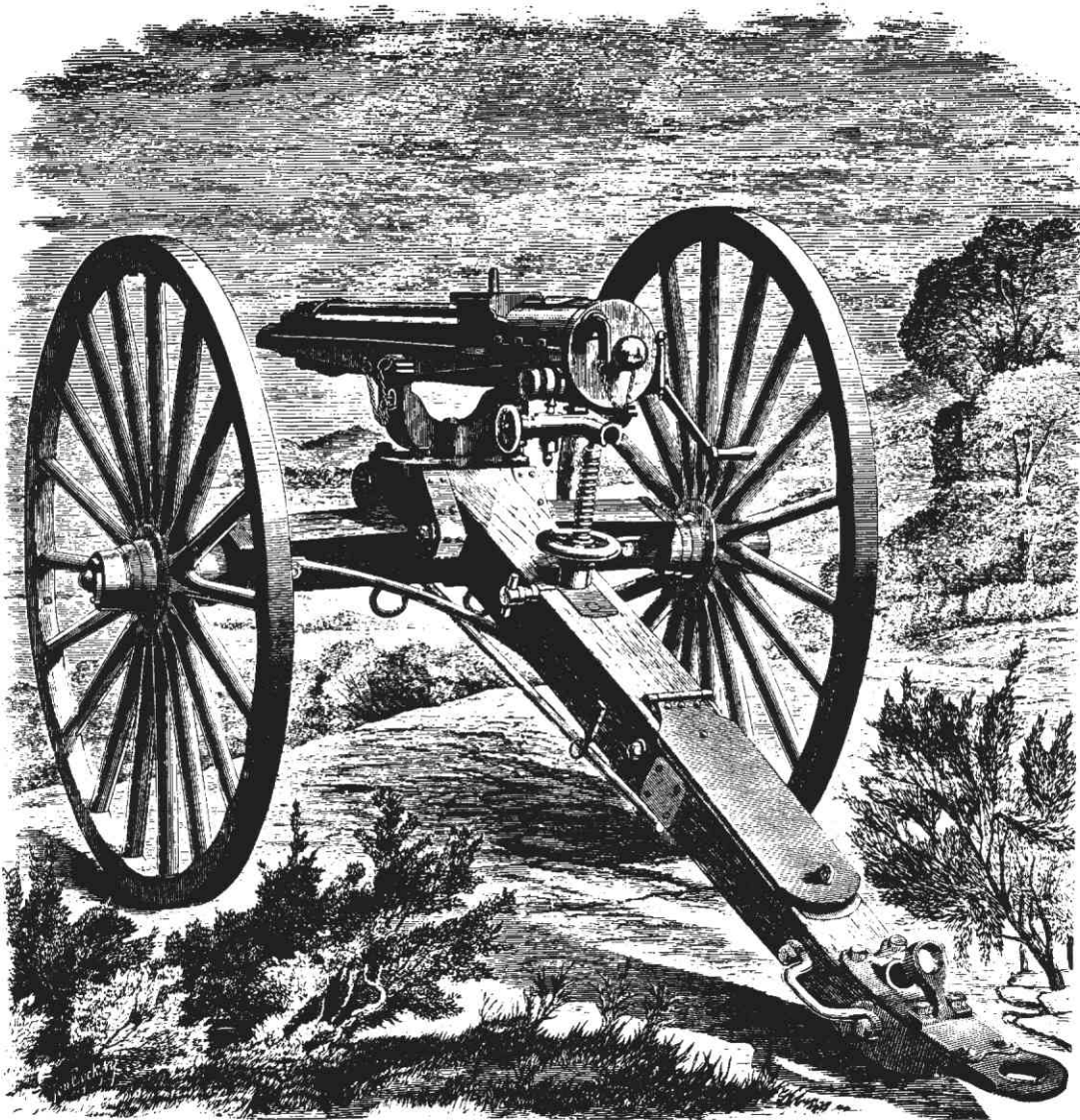
Model	Year Produced	Cartridge	Quantity	Serial Numbers
M1862	1862-63	.58 chamber	13	unknown
M1864	1864-65	.58 rimfire	?	unknown
M1866	1866	1 inch c.f.	12+	unknown
M1866 Improved	1866	1 inch c.f.	49	1-23, 26-35, 37-52
M1866 Navy	1866	.50-70 centerfire	21	1-3, 5-8, 12-17, 19-26
M1866 Army	1866	.50-70 centerfire	24	4, 9-11, 18, 34-44, 46-48 50-51, 53-55
M1871	1871	1 inch c.f.	1	1
M1871 Army	1871	.50-70 centerfire	9	100-108
M1871 Navy	1871	.50-70 centerfire	?	?
M1874 Camel	1874	.45-70 centerfire	56	1-56
M1874 Long	1874	.45-70 centerfire	8	57-63, 105
M1875 Long	1875	.45-70 centerfire	44	107-146, 163-166
M1875 Camel	1875	.45-70 centerfire	4	159-162
M1875	1875	.45-70 centerfire	?	?

Model	Year Produced	Cartridge	Quantity	Serial Numbers
Navy M1876	1876	.45-70 centerfire	18	170-188
M1877 Long	1877	.45-70 centerfire	11	191-193, 196-201, 225, 226*
M1879	1879	.45-70 centerfire	18	225, 226,* 228, 229, 231-242
M1879	1880	.45-70 centerfire	14	245-258
M1881	1881	.45-70 centerfire	25	295-319
M1881	1882	.45-70 centerfire	2	321, 323
M1883	1883	.45-70 centerfire	40	342-381
M1885	1885	.45-70 centerfire	21	405-425
M1886	1886	.45-70 centerfire	20	431-450
M1887	1887	.45-70 centerfire	20	457-476
M1889	1889	.45-70 centerfire	18	492-509
M1891	1891	.45-70 centerfire	18	510-527
M1892	1892	.45-70 centerfire	18	530-547
M1893	1893	.30-40 U.S.	18	1001-1018
M1895	1898	.30-40 U.S.	94	1032-1049, 1050-1125
M1903	1907	.30-06 U.S.	32	1128-1159

\* Serial Numbered guns 225 and 226 were duplicated in error at the Colt's factory.



Two civilians firing a tricycle-mounted M1883 Gatling gun with six barrels. The feeders contain 106 cartridges each, and the advertisement claimed that one feeder could be fired in less than three seconds! *Scientific American*, September 12, 1885.



A Model 1874 Gatling gun on a field carriage. Note the gun could be elevated and traversed as it was being fired. The Broadwell cartridge feed drum has been removed. *Scientific American*, February 7, 1874.