BROWNING WATER-COOLED MACHINE GUN

Not long after John Browning invented the world’s first gas operated fully automatic machine gun, the Model 1895 Automatic Gun, he realized that there must be a better, simpler, more efficient operating system. He set about to create his version of a short-recoil operated machine gun that was significantly different from the then current Maxim design.

The Model 1901

On June 19, 1900, Browning was granted U.S. Patent No. 678,937, which was his first patent on a recoil operated machine gun. This “first” gun was substantially different from his later, more familiar, versions. The gun ejected the empty brass cartridges out to the right side rather than through the bottom, had an external feed lever, a specialized cartridge belt that left most of the cartridge body exposed, and its trigger and firing mechanism were significantly different and featured a hammer driven firing system. Nevertheless, this first model set the stage for further development and had many features that are recognizable in his later guns. This included a barrel attached to a separate barrel extension, an accelerator to speed up the movement of the bolt, a rising breech block, a claw extractor and a recoil spring guide with a coil recoil spring that could be turned thus locking the recoil spring inside the bolt body.

The tripod cradle he created in his workshop for this gun was reminiscent of the type and style as used on the Model 1895 Automatic Gun and used the Model 1895-style belt box with a sliding lid.

Browning informed the U.S. Ordnance Department of his new invention, but they were not interested and it appears that they never even examined it for testing.

The Model 1910

Over the next several years, Browning continued to work to refine his recoil operated machine gun. He redesigned much of the internal operating system eliminating the hammer method of firing and replacing it with a firing pin with a sear notch on the end and added a trigger bar that engaged a sear that released the sear notch on the firing pin. He added a pistol grip with fiber buffer discs that absorbed excess energy and helped “bounce” the bolt back to battery and simplified the ejection system to eject the spent cartridges out through the bottom. There were other minor improvements as well such as using breech lock de-
peditionary Force that went to France in 1917 went to war with no machine guns and had to be initially equipped with the French M1914 Hotchkiss heavy machine gun and the disastrous M1915 Chauchat machine rifle.

In 1917, after much delay, procrastination and indecision, the U.S. finally put out a call to American inventors to submit designs for consideration. John Browning had been waiting for just such a call and personally traveled to Washington, D.C. to present his guns. That is guns, plural, because besides bringing his improved Model of 1910 water-cooled machine gun, he also brought along another project he had been working on: the Browning Automatic Rifle (BAR).

In May, 1917 the official endurance trial test was held at the Government Proving Ground at Springfield Armory. The Army requested that 20,000 rounds be fired. The 30,000 rounds were fired without a malfunction or broken part. And, to the amazement of all, Browning fired an additional 20,000 M1917A1 accessories included water condensing can, early wood and later metal ammunition boxes, 1917 belt loading machine, water condensing hose, combination tool, anti-aircraft sight, ruptured gages, clinometer, spare barrel cover, etc.

In May, 1917 the official endurance trial test was held at the Government Proving Ground at Springfield Armory. The Army requested that 20,000 rounds be fired. The 30,000 rounds were fired without a malfunction or broken part. And, to the amazement of all, Browning fired an additional 20,000 M1917A1 accessories included water condensing can, early wood and later metal ammunition boxes, 1917 belt loading machine, water condensing hose, combination tool, anti-aircraft sight, ruptured gages, clinometer, spare barrel cover, etc.

In May, 1917 the official endurance trial test was held at the Government Proving Ground at Springfield Armory. The Army requested that 20,000 rounds be fired. The 30,000 rounds were fired without a malfunction or broken part. And, to the amazement of all, Browning fired an additional 20,000 M1917A1 accessories included water condensing can, early wood and later metal ammunition boxes, 1917 belt loading machine, water condensing hose, combination tool, anti-aircraft sight, ruptured gages, clinometer, spare barrel cover, etc.

Browning had been working on: the Browning Auto- 

rounds – 40,000 rounds in total – with just one failure of a component part. The board overseeing the test consisted of five Army officers and two civilians appointed by the Secretary of War, and they recommended the immediate adoption of the weapon as the Model of 1917 noting the outstanding reliability and simplicity of design. They were particularly impressed that the officers who demonstrated the gun were able to take the gun apart and put it back together in minutes – blindfolded. This had never been done before and became the standard “blindfold test” at machine gun schools.

Browning knew that there still needed to be some refinements done on the heavy machine gun. He returned to the Colt factory, who had exclusive manufacturing rights, to personally improve and function test the gun to make certain it was ready for a public demonstration at Congress Heights just outside Washington D.C. on February 4, 1919 as U.S. Patent No. 1,293,021: Automatic Machine Gun.

The U.S. government showed practically no interest in machine guns. It had adopted the Maxim gun in 1904 and the Benet-Mercie machine rifle in 1909, but both weapons were few in numbers and tactics were sorely lacking. When war broke out in Europe in 1914, there was again a slight flurry of machine gun interest in the U.S. and the Vickers was adopted in 1915. But even with almost three years to prepare for the eventual U.S. involvement in World War I in 1917, there was no effective machine gun development program in spite of the fact that it was obvious that the war in Europe was a machine gun war. It was under such circumstance that the American Ex-
Browning Model of 1917 being demonstrated at Congress Heights on February 27, 1918 mounted on an M1917 tripod. (U.S. National Archives)

problems with the new gun.

Because the gun was accepted so quickly, a full trial of tests of all aspects of the gun were either omitted or rushed so as to get the gun into production. Further testing was conducted while the gun was in production but production guns were entering the field with flaws. It was probably fortunate that the gun actually saw limited combat use. If it had been used longer under the harsh and demanding conditions that permeated WWI, the failure rate would have mounted very quickly. Though there were few problems encountered regarding the functioning of the guns in the field, there were a high number of parts failures due to improper material preparation, poor workmanship, and inspection.

Into The Crucible – Finally

A machine gun training facility was established at Camp Hancock in Augusta, Georgia though the majority of the graduates never engaged in combat in France. The first Browning guns arrived in France on June 29, 1918 and shortly thereafter, training commenced there even though there was a shortage of guns, spare parts and instructors. The shortage of instructors was so acute that Val Browning, John Browning’s son, went to France to be an instructor on the new gun. As more guns arrived and the training continued, particularly with the 79th and 80th Divisions, the guns were ready to be fielded for combat in September of 1918. The first instance of combat usage was in the Meuse-Argonne Forest on September 26, by a small detachment of the 79th Division, where in the wet and muddy conditions, the new Browning performed exceptionally well with one company firing 10,000 rounds per gun.

In all, a total of 1,168 Browning guns actually made it to the front lines of World War I seeing action for only two months before the war ended. While that number may initially seem impressive, it was not, as only a very small portion of the Allied Expeditionary Force was so equipped. It was too little, too late. But that didn’t matter because the fresh influx of American troops fighting against an army that, after four years of decimating casualties, was the final hammer blow to a substantially weakened enemy. Nevertheless, it should be noted that even in the German Army’s death throes in those final three months, they fought valiantly to the end and inflicted serious casualties on the American fighting forces who were generally equipped with French machine guns and the U.S. Model of 1915 Vickers, not the new Browning. And, there were problems with the new gun.

Problems

Because the gun was accepted so quickly, a full trial of tests of all aspects of the gun were either omitted or rushed so as to get the gun into production. Further testing was conducted while the gun was in production but production guns were entering the field with flaws. It was probably fortunate that the gun actually saw limited combat use. If it had been used longer under the harsh and demanding conditions that permeated WWI, the failure rate would have mounted very quickly. Though there were few problems encountered regarding the functioning of the guns in the field, there were a high number of parts failures due to improper material preparation, poor workmanship, and inspection.

On May 10, 1918, just four months after getting the contract, Westinghouse made their first delivery of 85 Browning Model of 1917 guns. By June of 1918, they had manufactured 2,500 guns. Colt was just beginning production. In June, Colt shipped 2,000 guns. The list continues naming another twenty key components. At some disputed barricade in the Meuse-Argonne front, US soldiers lay down fire with their Browning Model of 1917 machine gun.

Problems

At some disputed barricade in the Meuse-Argonne front, US soldiers lay down fire with their Browning Model of 1917 machine gun.

Problems

At some disputed barricade in the Meuse-Argonne front, US soldiers lay down fire with their Browning Model of 1917 machine gun.

Problems

At some disputed barricade in the Meuse-Argonne front, US soldiers lay down fire with their Browning Model of 1917 machine gun.
Post War WWI Development

It was fortunate that the war ended when it did in terms of weighing the problems on the Model of 1917 Browning water-cooled machine gun. Production continued after the war with most of the 72,500 guns ultimately produced being assembled in the post-war era. It was during this time, from about 1919 to the mid 1930s that work continued to performing the machine gun. Comprehensive testing continued, metallurgy improved, standardization of manufacturing processes was established and different design changes were conceived and tried. In 1922, the rear sight was changed from inches to yards. (Meters were used as all the firing tables and maps used in World War I were in meters.) In 1926, there were modifications to the buffer to accommodate the 10% increase in recoil energy due to the adoption of the more powerful 172-grain boat-tail M1 30-06 cartridge, but the sight graduation wasn’t changed until 1938.

The biggest modification was the retrofitting of Model of 1917s with a reinforcement sirup under the breech lock cam, which produced a lot of stress on the bottom and side plates.

Different methods were used as were different sizes of brackets. Initially, a simple “U” bracket was either riveted or welded just under the breech lock cam. It wasn’t until 1936 that a program was initiated by Rock Island Arsenal to convert all existing Model of 1917 Browning water-cooled machine guns are acquainted with the versatility of various types.

M1917 Tripod

Historians familiar with the Browning family of 30-caliber machine guns are acquainted with the versatility of various types.

1. Make sure the gun is unloaded by checking to make sure there is no belt in the feedway. Open the top cover and cycle the bolt to the rear three times and visually check the chamber and T-slot on the bolt face that no cartridges are present. Return bolt to forward position and close top cover.
2. Drain water from the water jacket by unscrewing the water jacket drain plug.
3. Pull the bolt handle back and hold in that position.
4. Push in on the driving spring rod protruding from the rear of the back plate and turn in the right so that the lugs on it will catch in undercut recesses in the bolt. Use a screwdriver or the base (rim) of a cartridge to turn the driving spring rod.
5. Push the bolt handle forward so as to remove the driving spring rod from the hole in the back plate.
6. Pull back on the top cover latch and open the top cover. Then, push the top cover latch forward and lift out the back plate.
7. Pull the bolt handle all the way back and draw the bolt handle out to the right.
8. The rear of the bolt will be visible. Grasp it by the top and bottom with the thumb and forefinger and pull it out of the rear end of the receiver. In order to get a better grip on the bolt, it can be pushed backwards from inside the receiver. Make certain that the driving spring rod is not pointed at the hand or any other part of the body or another person. It must be pointed in a safe direction. The driving spring rod is under tremendous spring tension, and if it should become loose (which can happen) it will be a very dangerous missile.
9. Push in on the trigger pin through the hole located on the right side of the receiver with the point of a bullet. Take hold of the trigger and draw the entire assembly.

10. Holding the barrel lightly, take hold of the lock frame and hold securely while pushing forward on the accelerator with the thumb. This unlocks the lock frame and barrel extension, which allows them to be separated.

11. Unscrew the barrel from the barrel extension.

12. Each complete assembly is now separated from any other assembly.

13. To reassemble the weapon, reverse the order.

 Members of the US 315th Machine Gun Battalion, 80th Division, advance through the wood with their Browning Model of 1917 machine gun between La Chalade and Le Clain, Meuse, France October 29, 1918.
Three soldiers of Company A, 339th Machine Gun Battalion, 88th Division, take a position on the Rhône-Rhône Canal near Égligny with their Browning Model of 1917 machine gun on October 29, 1918.

BROWNING  

The elevation mechanism at the rear of the M1917 cradle (left) is the only function conducted at this location. Note the large elevation and traverse mechanisms located at the rear. Mil marks for fine adjustments are located on each adjustable wheel and in the traversing bar.

Major parts; the legs, the socket, the pintle and the cradle. The legs are steel tubing having feet attached to one end and the serrated connections to the other. The socket is of manganese bronze and is the part to which the leg are assembled, in which the pintle revolves and in which the slow motion mechanism and stops are attached. The traversing clamp is also attached to the socket. The pintle is the center member of the tripod and carries the cradle clamp and traversing stop pin. The cradle is attached to the top of the pintle and is used to allow a quick elevation or depression of the gun. It carries at its rear end the elevating mechanism which allows a micrometer adjustment of the elevation. It has a 360 degree free traverse graduated in 2 mil intervals for 6,400 mils; a clamping feature on the pintle similiar to that used on the British (Vickers) Mark IV Tripod; a slow traversing worm gear mechanism graduated in 2 mil intervals and traversing stops adjustable to a single mil both having a quick throw off to allow for free traverse; an elevating mechanism of 125 mils capacity and graduated to 1 mil on an adjustable dial; a cradle construction on the pintle which allows a quick elevation or depression of 30 degrees each way with graduation marks at 12-1/2 mil intervals. The weight is approximately the same as the British (Vickers) Mark IV Tripod, that is, 50 pounds."

Captain Stanley continues in a conclusion that, "This tripod was not originally designed for the slow motion mechanism, or for stops. Accordingly the slow motion and stops are not especially efficient, although they are very quiet and positive in action. The tripods have been issued to troops and such reports as have been received show them to be highly satisfactory. No adverse criticism has been received except in regard to the stops and slow motion mechanism."

M1917 Browning machine guns were upgraded and modified to A1 specifications in a rebuild program in the 1920s and ‘30s and an original M1917 Browning machine gun that has not been modified and upgraded is exceptionally rare. So too, the M1917 tripods were also modified and upgraded to the A1 tripod specifications. This often consisted of removing the traversing worm gear adjust- ment wheel mechanism attached to the worm gear and replaced with a tear-shaped cover over the resulting hole. An original, as manufactured, M1917 tripod is an extremely rare collect- able accessory.

<table>
<thead>
<tr>
<th>BROWNIN 1917G MODEL</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Caliber:</td>
<td>.30-06</td>
<td></td>
</tr>
<tr>
<td>Weight of gun without water:</td>
<td>30 pounds</td>
<td></td>
</tr>
<tr>
<td>Weight of gun with water:</td>
<td>36.75 pounds</td>
<td></td>
</tr>
<tr>
<td>Water jacket capacity:</td>
<td>7 pints</td>
<td></td>
</tr>
<tr>
<td>Length of gun:</td>
<td>38.5 inches</td>
<td></td>
</tr>
<tr>
<td>Length of barrel:</td>
<td>24 inches</td>
<td></td>
</tr>
<tr>
<td>Method of operation:</td>
<td>Short recoil</td>
<td></td>
</tr>
<tr>
<td>Operation:</td>
<td>Full automatic</td>
<td></td>
</tr>
<tr>
<td>Cyclic rate of fire:</td>
<td>500 rounds per minute</td>
<td></td>
</tr>
<tr>
<td>Feed:</td>
<td>250-round fabric belt</td>
<td></td>
</tr>
<tr>
<td>Weight of loaded belt:</td>
<td>15.25 pounds</td>
<td></td>
</tr>
<tr>
<td>Front sights:</td>
<td>Protected blade</td>
<td></td>
</tr>
<tr>
<td>Rear sights:</td>
<td>Peep, adjustable leaf graduated to 2,800 meters</td>
<td></td>
</tr>
</tbody>
</table>

Bottom left: Right side view of the M1917 cradle where it attaches to the tripod head. Seen is the large clamping handle to provide coarse adjustments of elevation and gross elevation marks on the cradle. The gun attaches directly to the cradle on the M1917. Also note the location on the tripod head just ahead of the rear leg clamp, the large clamping feature on the pintle similiar to that used on the British (Vickers) Mark IV Tripod; a slow traversing worm gear mechanism graduated in 2 mil intervals and traversing stops adjustable to a single mil both having a quick throw off to allow for free traverse; an eleva- ting mechanism of 125 mils capacity and graduated to 1 mil on an adjustable dial; a cradle construction on the pintle which allows a quick elevation or depression of 30 degrees each way with graduation marks at 12-1/2 mil in- tervals. The weight is approximately the same as the British (Vickers) Mark IV Tripod, that is, 50 pounds.