ORDNANCE

New Front Sight Improves Garand Semiautomatic Rifle

Severe Tests in Actual Service Demonstrate Weapon's Ability to "Take It"; Advantages, Drawbacks Compared

A NEW FRONT sight for the Garand rifle has just been patented by its inventor, John C. Garand of the U. S. Arsenal at Springfield, Mass. The patent (No. 2,208,576) has been assigned to the United States of America, as represented by the Secretary of War. Advantage of the new sight, aside from simplicity of manufacture and ease of installation, is the readiness with which it may be offset from the true center line of the barrel, to allow for the drift of the bullet caused by the spin of the rifling.

In the meantime, practical field tests of the Garand rifle, now known officially as U. S. rifle, caliber .30, M1, are being reported by commanding officers of infantry units that have been giving it "the works." Satisfactory performance under the hardest conditions is reported in the hands of both veteran and untrained troops. Commenting editorially, *Army Ordnance* remarks, "When a test weapon receives a diploma from the school of the doughboy, it is truly fit for the wars."

Brig. Gen. Karl Truesdell, commanding the First Division, balances advantages and disadvantages of both the M1 and the Springfield model 1903 rifles. The former, he says, has the great advantage of very rapid fire, especially for anti-aircraft action. Its recoil is light, making it easier to instruct recruits in its use. Much less fatigue is experienced in sustained fire. Eight cartridges to the clip, instead of five, saves much time in reloading.

The Springfield has the advantage of being a more accurate rifle for target-range purposes. The five-cartridge clip is lighter and easier to handle. Maintenance is simpler.

As disadvantages of the Garand rifle, Gen. Truesdell mentions the temptation to use up ammunition too fast, due to the rapid, semi-automatic firing; lower accuracy at ranges beyond 500 yards; and the necessity for the soldiers to load their own clips.

As principal disadvantage of the Springfield Gen. Truesdell cites greater fatigue due to the necessity of working the bolt for each shot, and especially the fact that this hand loading throws the sights off the target every time.

One thing that is not forgotten, even while praising the new semi-automatic rifle, is that the Springfield '03 model is still decidedly the best bolt-action military riffle in the world, considerably superior to any weapon now being used by European armies. To sum it up, the U. S. Army is discarding the world's best infantry rifle for one that is still better.

New Trench Mortars

The Army's new trench mortars, handy weapons which the infantry can carry right up with the first wave of attackers to do part of their own artillery work, can be produced rapidly and cheaply from standard seamless steel tubing, Capt. Daniel J. Martin, U. S. A., points out (*Army Ordnance,* July).

Not only the tube of the weapon itself but the shells it fires can be made in this way. This rapidity and economy in procuring an important weapon and its ammunition are regarded as having particular significance in the present emergency preparedness program.

Shells for the new-type trench mortars are given a streamline shape in special presses, and fins are fitted at the tail to keep them from tumbling in their flight and losing accuracy. In this they contrast strongly with the old Stokes mortar shells of First World War days, which were ordinary straight-sided artillery projectiles. Although the Stokes mortar was effective, especially as a defensive weapon against mass attacks of infantry, its lack of accuracy left much to be desired.

For this reason, post-war experiments were undertaken by a French ordnance officer named Brandt, who evolved the present streamlined, fin-tailed projectile. The U. S. Army acquired American rights to the Brandt patents and has made improvements in both the weapons and their ammunition.

As developed in recent years, trench mortars belie their name. They are not intended primarily for use in trenches, but as light weapons that can be carried up into combat by advancing infantry, or on scouting expeditions by mechanized cavalry, to blast out stubbornly held machine-gun positions. They can be carried in trucks or other vehicles, or across rough terrain by the men themselves.

Two calibers have been adopted as standard for the U. S. Army: 60 millimeters (2.36 inches), throwing a 3-pound shell to an extreme range of 750 yards; and 81 millimeters (3.15 inches), throwing either a 14.5-pound shell 1280 yards or a lighter, 7.6-pound shell 3280 yards.

The little 60-millimeter mortar should be the doughboy's pet, for it is so light (39 pounds altogether) that one man can pack the whole weapon. The 81-millimeter piece has an assembled weight of 134 pounds, and comes apart into three fairly hefty backloads.

Trench mortars are smoothbore weapons, and depend on the projectile's tail-fins to maintain smooth and accurate trajectory. They are fired at high angles (always more than 45 degrees) and use very small powder charges. The normal charge is loaded into a cartridge like a shotgun shell, fixed to the base of the projectile. This is dropped down the barrel, and as it strikes bottom the explosive cap makes contact with an upward-projecting pin. With a muffled "Pung!" the shell promptly comes out again and sails away toward its target in a high arc.

Flashless and Smokeless

When the new powder plants, to be built near Louisville, Ky., by the government and operated by du Pont, begin to turn out their 200,000 pounds per day, more than tripling the nation's existing output, they will be making a propellant that is markedly superior to the powder of World War days.

The standard U. S. Army powder is now flashless as well as smokeless. And it does not absorb moisture that interferes with the accuracy of fire.

Intensive research begun in 1919 by the Ordnance Department and private manufacturers resulted in the production in 1924 of a flashless non-hygroscopic smokeless powder for the 75 mm. gun. Since then there have been perfected satisfactory powders for use in the larger 155 mm. gun, using about 25 pounds per charge, as well as in all lesser calibers.

With ordinary smokeless powder there is a blinding flash that allows the enemy to spot the gun, day or night, almost as easily as if the gun belched forth smoke. Over half of the gases produced by the combustion of smokeless powder in a gun are combustible, largely carbon monoxide and hydrogen. The flash beyond the muzzle occurs spontaneously when these hot gases mix with oxygen of the air.

During the World War the Germans added potassium chloride and common salt to their powder to reduce flash. The French added a little vaseline. American practise was to add a cooling agent to standard service powder in a separate cloth bag or packet. These were only partially effective as to flash and did not prevent absorption of moisture. The present U. S. Army flashless powder has flash reducers, waterproofing agents and non-volatile colloiding agents mixed with the nitro-cellulose of the powder.

The U. S. powder is entirely flashless. At night there is a small dull-red glow for a short distance in front of the muzzle, but it fails to register on photographic plates. Besides keeping the gun's location a secret from the enemy, lack of flash relieves the gun crew of being temporarily blinded every time the gun is fired.

Even the "bang" of guns using the newer flashless powder is reduced. The gas explosion in front of the muzzle is eliminated and the noise of the gun consists only of the sound of the sudden release of the gases from the muzzle. This makes it difficult for the enemy to locate the gun by use of sound ranging.

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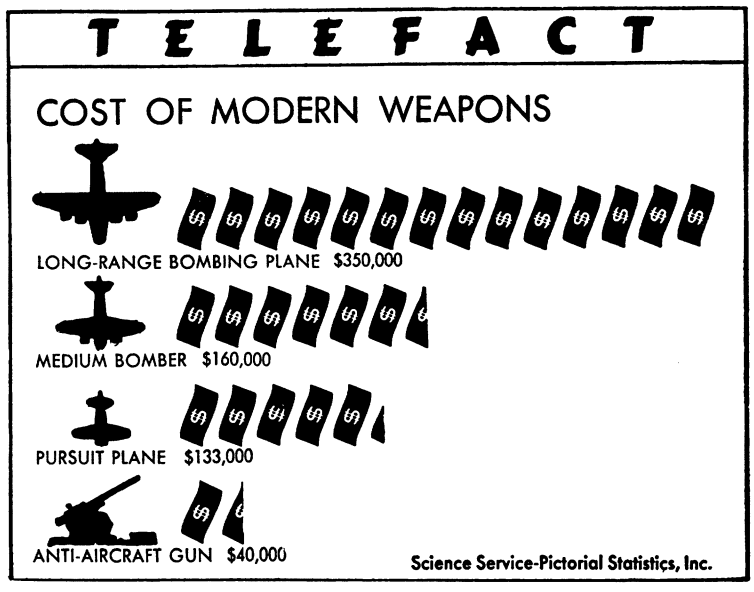

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BACTERIOLOGY

Bacteria-Killer From Soil Effective in Cattle Disease

PROMISING results in the first trials at treating a real sickness with gramicidin, potent germ-killing chemical from soil bacilli or germs, are reported by Dr. R. B. Little, R. J. Dubos and R. D. Hotchkiss, of the Rockefeller Institute for Medical Research.

The power of this chemical from one kind of a germ to kill other germs that cause deadly diseases caused a sensation in both lay and scientific worlds when Dr. Dubos first announced it.

At that time the chemical's germ-destroying ability had been shown in test-tube experiments and in laboratory mice sick with peritonitis which the scientists had given the animals by injections of pneumonia germs and streptococci.

Trial of the chemical as a remedy in cases of real sickness, instead of experimental ones in the laboratory animals, has now been made. The patients were cows at the Rockefeller Institute's department of animal and plant pathology at Princeton, N. J. They had a chronic form of bovine mastitis caused by germs of the streptococcus family. The germs in this disease generally get into the cow's milk and while they may not cause disease in humans drinking it, they have a deleterious effect on the milk.

Treatment of the cows consisted essentially of injecting a solution of gramicidin into the infected quarter after milking and allowing it to remain until the next milking.

"While the streptococci were not eliminated from all of the infected quarters," the Rockefeller scientists report (*Proceedings, Society for Experimental Biology and Medicine,* July) "they were markedly decreased after each treatment, and the findings thus confirm the results obtained in mice, namely, that gramicidin, when injected directly into an infected focus, exhibits a definite bactericidal effect against streptococci."

The treatment did not produce what might be called a permanent cure in all of the animals treated. This may have been due to the fact that the method of giving the chemical could be bettered. The state of lactation and other factors may have been responsible for the partial failures.

These factors must be considered, the scientists point out, and many more animals must be treated over a longer period of time before the effectiveness of gramicidin in the control of bovine mastitis can be determined.

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To avoid disturbing the *water* around fishermen's boats, Missouri Conservation agents will inspect permits "long distance": the fisherman holds his permit aloft and the agent, in a speed boat, inspects it through field glasses.