

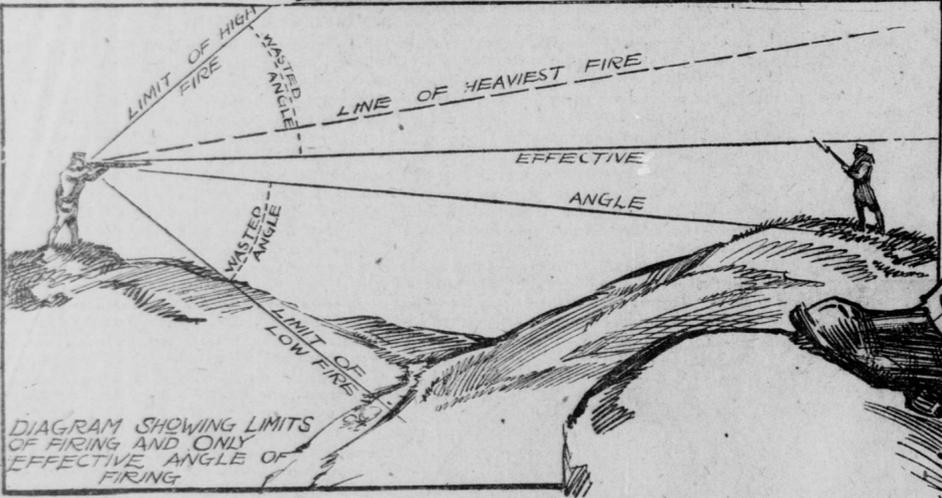
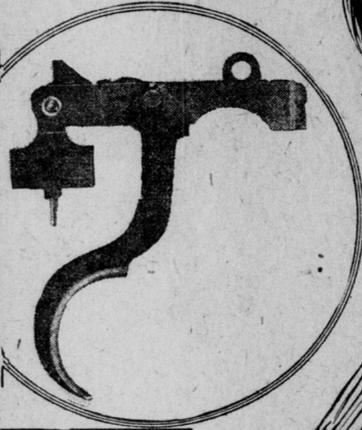
# A DEVICE TO MAKE THE SOLDIER HIT HIS MARK

**Captain Frank D. Ely, of the Presidio, Promises to Multiply the Deadliness of Modern Warfare Many Fold by His Invention. In Battle Only One Shot in 600 Has Been Aimed So as to Hit the Mark: Ely's Invention Will Not Let the Gun Fire Until It is Correctly Aimed.**

By Ashleigh B. Simpson

CAPTAIN FRANK D. ELY, quartermaster of the Thirtieth United States Infantry and of the Presidio of San Francisco, has solved with his remarkable invention, the Ely mechanical fire control, a problem that has baffled the foremost inventors of this country and Europe. He has corrected the greatest defect in the use of small arms in warfare—the practical elimination of human excitement, which has ever meant inaccuracy and vast waste of ammunition in high firing. He has opened the way for the writing of another chapter in the history of warfare hitherto considered impossible—accurate night firing. It may be said that Captain Ely has made the last and best step in the perfection of small arms, for he gives rifles an efficiency that is appalling.

Captain Ely's device is a contrivance which automatically prevents the discharge of a rifle pointed too high or too low. The adjustment can be made so delicate that the rifle can not be fired unless it is held at perfect aim. For military purposes, however, such absolute accuracy would be more of a hindrance than a help. Captain Ely has calculated that in warfare the effective



shooting angle or "play" of the rifle is about four degrees. He has made his mechanical fire control accordingly. The "play" is necessary for the reason that in warfare shooting is not done at definite objects—that is, a soldier does not deliberately pick out his man, aim carefully and shoot, but endeavors at the command of the captain to "beat up" a certain stretch of ground to create a danger zone. In the excitement of battle the soldier is liable to fire straight into the zenith or straight into the ground. The vertical range of fire has been calculated to be easily 180 degrees. A very heavy fire may be delivered throughout a vertical range of 90 degrees. If all the fire of the wasted angles could be massed into the effective angle would not the result mean an enormous increase in efficiency? By his remarkable device Captain Ely has accomplished this massing, has made possible an almost inconceivable efficiency.

Six years ago Captain Ely chanced to overhear an idle remark which put in his head the nebulae of the invention. The device is now complete. It is so simple that one wonders why it was not thought of before, and it seems without fault—absolutely "fool-proof."

Even to those who have read of the world's wars, upon whose memory has been stamped the historian's pictures of great battles, military science and the art of warfare are phrases of which they have no proper conception. Beyond the vision of symmetrical rows of soldiers, shining barrels, white gloves and brass buttons, he knows nothing. He is not able to appreciate what a device like the Ely mechanical fire control means to the world, what its influence is on warfare, what its adoption by one of the great powers would signify.

broom handle. Mark each step in the evolution of the old flintlock into the modern Springfield and you will have touched upon that which has changed warfare from a question of "right or might" to a question of skill and science where numbers cease to be the only consideration of importance. History that was made under the first condition would never have been possible under the second. History that has been made under the second would not be possible under the conditions that Captain Ely's mechanical fire control is making for the future.

The question of land battle comes down to the efficiency of small arms. To such a great extent has the rivalry between nations increased in perfecting small arms that the importance of a device like the Ely mechanical fire control must be apparent.

Captain Ely says of his invention: "It is doubtless something of a shock to the satisfied advocates of old time methods to the exclusion of modern advancement that a mechanical attachment on a rifle could enable absolute strangers to it to make more hits, and that blindfolded, than even the Boers when they made the world's record for the best and most efficient battlefire. Not only did these strangers make a higher percentage of hits, but a percentage over 24 times as great. The Boers' remarkable record at Colenso, the greatest in history, was one-sixth of 1 per cent, one hit in 600 shots. In the test of the mechanical fire control at the school of musketry, Presidio of Monterey, 29 blindfolded men fired at will five shots each at a line of 25 kneeling figures 780 yards away. There were 145 shots fired. Six hits were made on five figures. It will be seen that the hits exceeded 4 per cent, and that the number of figures struck was 20 per cent, thus making the distribution of hits almost perfect."

"For 20 years foreign nations have been attempting to apply mechanics to control the human element in battle. The records of the German patent office are a revelation of the amount of effort expended in that direction. But the German devices are all very complicated and imperfect. The French are better mechanics and have been hard at work on the problem. With their short term men and the national unfamiliarity with the rifle they realize with commendable foresight the tremendous advantages to be gained by a successful solution. With a machine controlled rifle fire every man will grind out more hits, just as with proper machinery a workman grinds out an increased product. Frequently a mere child can manage a machine that produces relatively great quantities of a product which requires considerable skill if made by hand. There is nothing

strange in the fact that the same rule can be applied to hits in battle, when all the conditions are remembered.

"The enormity of our national budget is becoming appalling. If we can show how efficiency may be more cheaply acquired, we may then reasonably expect prompt increase of the mobile army to numbers more nearly commensurate with the duties performed, and the extent of the territory and interests protected. Our expensive military policy has burdened us with excessive annual charges for our past neglect; while the increasing demands upon our national treasury by our 90,000,000 of people verge us upon bankruptcy. We must still get results, but we must get them more quickly, easily and cheaply.

"Factory made hits are not only cheaper but easier to obtain in large numbers than any other kind, due to the conditions of modern war. It will be universally conceded that it would be folly to issue rifles without sights and it is even greater folly to continue to issue rifles without first equipping them with that other hit-maker and hit-getter—mechanical fire control."

In controlling beyond measure the weakness of the human element in war the Ely mechanical fire control strikes to the very heart of inefficiency in battle fire, a defect that has been so predominant through the ages that historians have mentioned it when describing statistically the result of some great conflict, and sages have been wont to say that a man's weight in bullets must be shot before he can be killed. Certainly there seems a truth in it when the world's record in battle is considered. That blindfolded men, absolutely inexperienced in the use of the Ely mechanical fire control, should achieve such remarkable superiority over that record indicates not only substantial merit but an epoch in battle fire and war training.

The mechanical fire control compels a reasonable accuracy both night and day from skilled and unskilled shots alike, is free from baneful effects of the human element of error and vastly increases the hits in battle; in fact it would be difficult to place any limit upon its efficiency. It will be realized that heretofore the hits in battle have depended upon many things, the training of the men, their condition, the weather and so on; that no matter the brains or skill of the commanding officer, success or failure has, after all, rested with the men and their ability to shoot. That uncertainty has passed with the coming of the Ely fire control, which places positive control with one man—the captain. It is plain that under such a condition accurate firing is merely a matter of determination and a simple command. Furthermore, the

device limits the vertical dispersion of fire in battle. All fire is necessarily low when the device is used, thus augmenting the advantages of the flat trajectory.

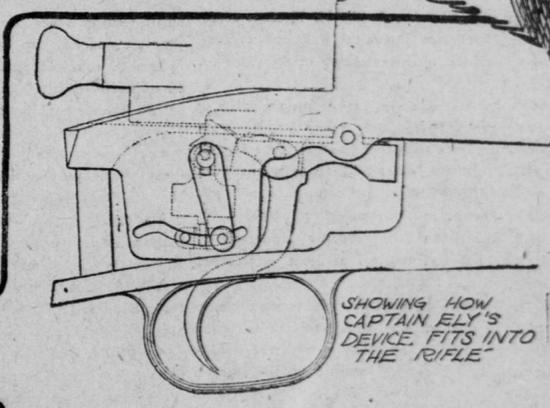
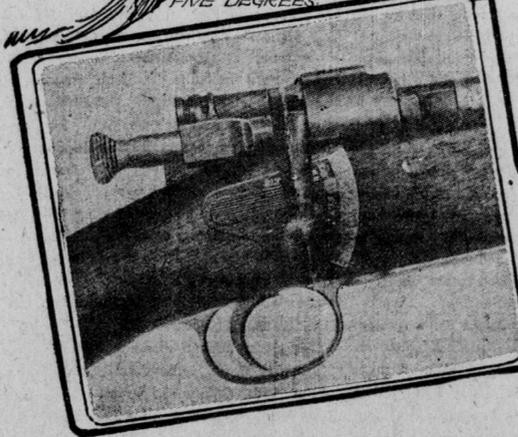
The simple mechanism of the Ely control is in marked contrast with the complicated designs of foreign attempts and with several infringements that have appeared in this country.

The essential parts of the Ely device are four in number—the pendulum, block, crank lever and scale. Gravity is effectually harnessed for the work, sensitiveness of motion and great strength both being obtained while momentum is avoided. Herein lies the secret of the successful mechanical fire control, for if momentum were gained by the pendulum the mechanism could not adjust itself with sufficient rapidity to admit of use in a firearm. Gravity is best applied in the form of a pendulum, since the ball or roller yields less readily to fine adjustment as well as to other requirements.

The pendulum is suspended from a simple pin driven through it with a triangular faced bearing at each end in the rear. The pendulum is limited in its swing by a pin driven into it from the bottom, which plays in a longitudinal slot out through the block. Owing to the shortness of the swing the pendulum acquires practically no momentum, and so comes quickly to rest when the piece is aimed. The transverse tongue on the bottom of the pendulum is shown in register with the corresponding groove across the top of the block, such registry being necessary to permit fire.

An experimental controller, fitted with a four degree groove, or fire sector, has been given violent motion

U.S. SPRINGFIELD RIFLE, READY FOR FIRING. MODEL A CONTROLLER SET FOR FIRING DOWN A SLOPE OF FIVE DEGREES.



SHOWING HOW CAPTAIN ELY'S DEVICE FITS INTO THE RIFLE

In model A the longitudinal slot through the block is shortened in front so that the tongue of the pendulum can not swing forward of the groove in the block. While high fire is prevented, there is no interference with good fire or low fire. The difference between models A and B is that model A simply holds fire below the angle for which the piece is set, whether angle be of elevation or depression, while model B limits fire to a given sector, the center of which passes through the objective and corresponds to the setting of the controller.

There is no spring to break, no gear to wear or to give backlash and no screw to work loose or get lost. The occasional drop of oil required in the nose of the rear runs down to the bearing of the pendulum pin in the rear and is the only lubrication needed.

The receiver plates which carry the rear are extended downward to carry the block, and meet the heavy trigger guard on either side in a long bearing, thus actually strengthening the piece in its weakest point. The controller as shown is applied to the United States Springfield magazine rifle, and in this form may be applied to any rifle of the Mauser type. It is readily adapted to any rifle.

An important improvement recently made is the adjusting lever stop made in one piece and weighing about a tenth of an ounce. This can be given any desired setting on the scale, along which it plays; and then by simply throwing the adjusting lever up against the stop, the controller is given the same setting. This feature is of great importance, especially for work at night or in close action, or on riot duty. The stop is almost instantly changed to any setting and this without the aid of any tool. It should be habitually carried set at 0, no reading then being necessary to set the controller for horizontal fire—the most common requirement. With the stop set the same setting of the controller is instantly made, as readily by night as by day.

Let us imagine that the Ely mechanical fire control has been adopted by one of the foreign powers and that the United States is at war with that particular country. We picture an invasion for instance on the Pacific coast at any one of the easy landing places. A great host of the hostile forces could be comfortably quartered at a hidden canyon of the coast range before our troops could possibly reach them. Presuming that our forces received word of the position of the enemy before nightfall let us follow their movements. The chances of attacking the enemy at night would be small and against all military experience if possibly avoidable. Our forces would no doubt make camp in another hidden canyon in the coast range after locating the enemy several miles distant. Nervous at the prospect of tomorrow's battle they would be in no shape for the sudden attack of the enemy, but the attack comes before our forces have had any warning.

The enemy is advancing upon the camp. They are swarming on the hillside above. Our troops are ordered to tear through the brush, stumbling, panting to the position. It is presumably an advantage. Our forces are higher than the enemy's, at least we think so, but it is pitch black and we are no sure. We are ready for the attack, why don't they shoot? They do. A blinding flash and a great sheet of lead has swept into our forces. Men are everywhere on the ground dying. Without even a chance to fire at the enemy in response, our forces are nearly devastated. The horrible effectiveness of the enemy's first fire is only too apparent. In the dark our men stumble over the dead and attempt to return fire, but our shots under the conditions are wild and for the most part are whizzing harmlessly over the hill, where the enemy is waiting for the next command, confidently, quietly, cruelly, for their fire means certain death. They have ceased to be human beings. The attack is unfair. It is between a great organized machine in possession of a mechanical precision and a disorganized, practically harmless force that gropes in blind terror for a safety that is not.

The picture is not alluring, but it is faithfully drawn. It shows the significance of the possession of mechanical fire control. We better appreciate, perhaps, what Captain Ely has done. His invention weighs scarcely two ounces, two ounces of science, one might say, which, when added to a rifle, saves tons of bullets.