

THE GATLING GUN.

Among the many important and valuable inventions in firearms, of which the present century has been prolific, there is none that equals the Gatling gun in originality of design, rapidity of fire, and effectiveness. The severest tests and trials, and its practical use in warfare, have indisputably established its high reputation as a most formidable death dealing weapon.

The main features of the gun may be summed up as follows: It has usually five or ten barrels, each barrel having its corresponding lock. The barrels and locks revolve together; but in addition to this action, the locks have a forward and backward motion of their own. The forward motion places the cartridges in the chambers of the barrels and closes the breech at the time of each discharge, while the backward motion extracts the empty cartridge cases after firing. The gun can be fired only when the barrels are in motion from left to right; thus as long as the gun is revolved and fed with cartridges, the several operations of loading, firing, and extracting are carried on automatically, uniformly, and continuously. The gun is supplied from feed cases (containing forty cartridges each) which fit into a hopper communicating with the chambers; as soon as one case is emptied another takes its place, and thus continuous firing is kept up at the rate of over one thousand shots per minute.

We believe the Gatling is the only firearm in the world in which the three sets of parts, namely, barrels, locks, and inner breech, all revolve. Having the barrels, locks, and inner breech to revolve simultaneously, enables the gun to be loaded and fired rapidly and continuously, while under revolution, and without producing recoil to destroy its accuracy.

That the gun is simple and durable is evidenced by the fact that one hundred thousand cartridges have been fired from it without injury to any of its parts. The Gatling guns represented in our illustration on first page are supplied with the new elevating and ranging fixture, which enables the operator to instantly elevate, depress, or traverse the gun, so as to keep it pointed at movable objects while being fired. The gun has not only been recently greatly improved, but its ammunition also, so that now its rate of fire is over 1,000 shots per minute.

There are a number of these guns with the British forces in South Africa, and in several engagements with the Zulus they have done most efficient service. Lord Chelmsford in his official dispatch, dated Durban, April 10, says, in speaking of an attack made on the column sent to relieve Colonel Pearson, at Ekowe: "The Gatling gun was of considerable value at this period of the defense." The London Standard of May 7th publishes an account of the battle of Ginghlovo, from which we take the following extract: "It was no use offering mercy to the Zulus. The wounded, as our men came up, fought on to the last, firing their rifles, stabbing with their assegais, and even seizing the natives as they passed over them with their teeth, biting like dogs, so, in spite of the efforts of our officers, they were all cut down. When all was over and we counted the dead, there lay, within a radius of 500 yards, 473 Zulus. They lay in groups in some places, of from 14 to 30, dead, mowed down by the fire of the Gatling, which tells upon them more than the fire of the rifles."

The new fixture for mounting Gatling guns can be used on gun carriage, tripod, gunwale, or tops of ships, or in the bow of a small boat.

Fig. 2 of the accompanying engravings shows elevation of top swivel with gun resting thereon, also lever. Fig. 3 is a plan of swivel and lever without gun.

This fixture supplies the place of the elevating screw and oscillator formerly used. It consists of fewer pieces, and is simpler than the screw and oscillator. With it the gunner has better and more instant control of his piece. The gun being well balanced on the fixture, the gunner controls the movement of the piece with his left hand, using his right to turn the crank. The gun rests with its trunnions in

the trunnion boxes, *a*, which are supported by the swivel, *A*. The caps, *a'*, of these trunnion boxes are held by an improved device, *b*, which prevents the accidental opening of the boxes, as in other styles, with keys which may fall out. The lower part of the swivel, *A*, fits the bed plate of gun carriage, tripod, etc., so that the gun and swivel can be quickly changed from carriage to tripod, or to the gunwale of a ship, or elsewhere, and be held firmly in place by the binder, *B*. To the lower part of the swivel, *A*, is pivoted the forked lever, *L*, which extends under the rear of the breech of the gun, being united with the gun by the sliding box, *D*, which is held between two lugs on the lower side of the breech by the pivot bolt, *d*. This box fits on the lever, *L*, so as to slide back when lever and breech of gun are raised, and forward when they are lowered.

Under the lower side of the lever, *L*, there is a key or wedge, *F*, which is tapered so that its lower surface is always parallel to the upper side of lever, *L*, but on sliding it forward the height of the lever, *L*, is increased, and the sliding box, *D*, is fastened. The screw, *G*, working through the side of the box, *D*, against the lever, *L*, serves as a second absolute fastening of box, *D*, on lever, *L*. On the end of the lever, *L*, is pivoted, at *e*, the handle, *E*, so that when depressed its lower part pushes the key, *F*, forward and tightens the slide, *D*. When the lever, *E*, is raised it pulls the wedge, *F*, back and loosens the slide, *D*. The handle, *E*, clasps a round lug, *f*, on the lower rear end of the wedge, *F*. The spring, *e*, serves to press the handle, *E*, downward. In operation the

shoulders of the operator, allowing him to raise or lower the gun, and as his body fits into the yoke any desired lateral motion can be given to the gun by a simple movement of the operator. The binder permits or checks lateral motion, and a screw adjusts the elevation. If in firing the correct elevation has been obtained, the screw is fastened, and the gun can be moved laterally in a horizontal line, so as to cover, at this elevation, any desired lateral distance. The operator's body being in the yoke steadies the gun, even when the binder is loose; he can work the crank with his right hand, resting his left on the yoke.

This gun is manufactured by the Gatling Gun Company, of Hartford, Conn.

NEW AGRICULTURAL INVENTIONS.

Mr. Jacob Kinstler, of Thomas Hill, Mo., has patented an improvement in plows, which consists in a plow beam pivoted to the plow stock and provided with a flanged and perforated rear end casting, that may be adjusted up or down or right or left.

An improvement in the class of fences whose panel rails are secured to posts by means of wire staples, has been patented by Mr. B. F. McCollister, of California, Mo.

Mr. Joseph W. Temby, of Dallas, Texas, has patented an improved combined wire and picket fence, which consists of two continuous wire rails having bends for receiving the pickets.

An improved device for securing cattle and horses in their stalls, has been patented by Mr. James D. Watters, of Bel Air, Md. It is not only capable of fastening or unfastening a single animal, but it is so constructed that all of the animals in the stalls may be released simultaneously. This is especially valuable in cases of fire.

Mr. Gottlieb Stettler, of North Georgetown, Ohio, has patented an improved apparatus for turning cheese. The invention is more particularly useful in making Swiss cheese, which requires turning daily.

An improved device for connecting the plow beam to the axle and tongue of a cultivator, has been patented by Mr. James M. Mitchell, of Point Peter, Ark. The improvement consists in the combination of simple devices, which cannot be clearly described without an engraving.

An improvement in that class of harrows having spiked cylinders has been patented by Mr. David I. Corker, of Amity, Oregon. The improvement relates to the use of pivoted locking bars, which will engage with or release the spikes of two cylinders simultaneously. The principal object of the invention is to free the spikes from adhering stubble.

Mr. W. V. Russell, of Elwood, Ind., has invented an improved fence, which consists of base blocks having dovetailed notches, to which are fitted uprights which support the rails. The fence also has a brace with a peculiar wire fastening.

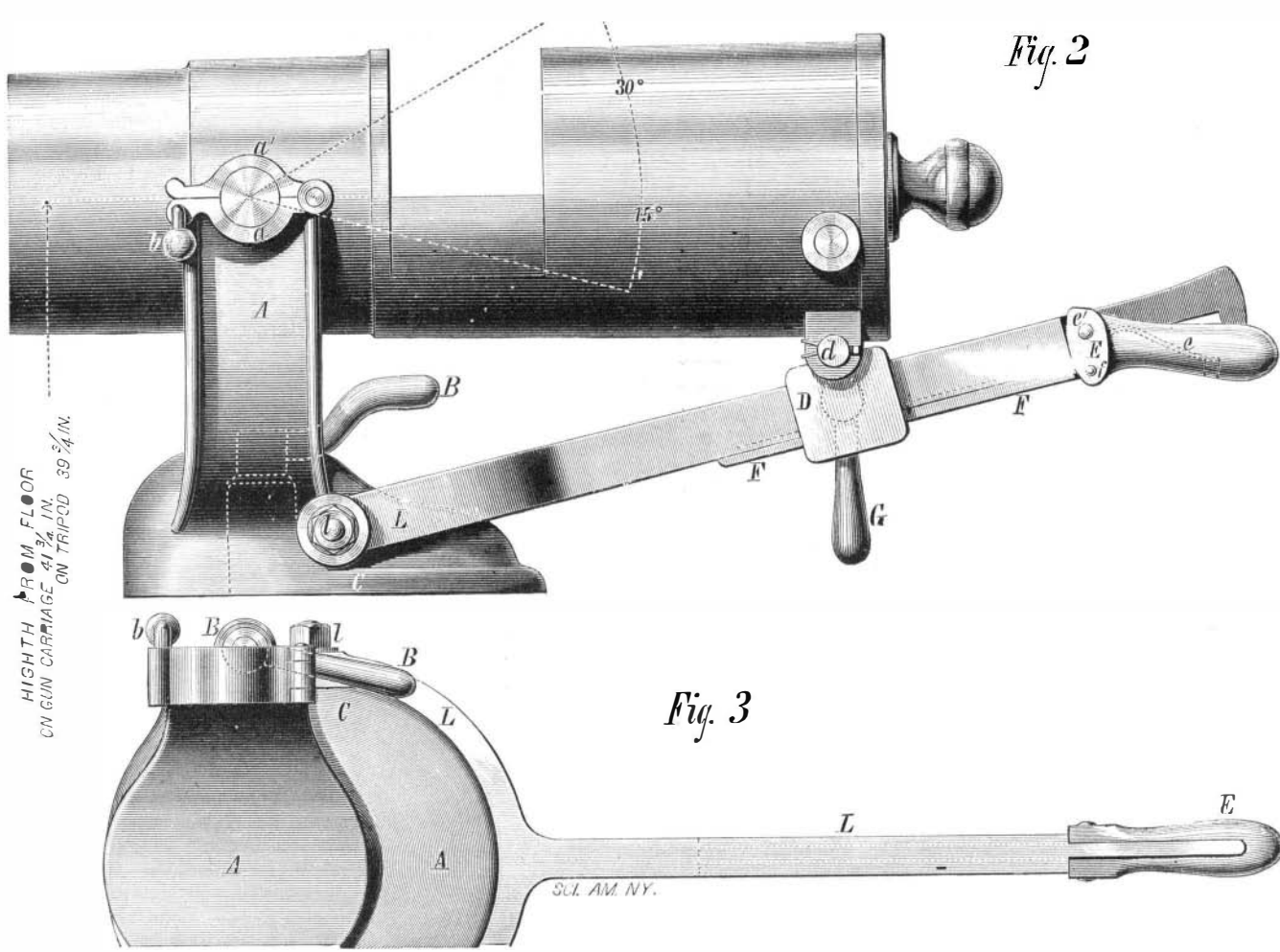
An improvement in gate shutters has been patented by Mr. Isaac A. Pool, of Escanaba, Mich. It consists in a rod pivoted at one end to the gate, and running through a sheath or gig is attached to a rope that runs over a pulley and is fixed to a weight.

Fruitfulness of a Grain of Wheat.

If, says a writer in a German contemporary, we reckon that a single grain of wheat produces fifty grains, and that these fifty will each produce fifty grains more, and so on, we find:

In the second year	2,500 grains.
" third "	125,000 "
" sixth "	15,625,000,000 "
" twelfth "	244,140,625,000,000 "

The third year's crop would give 300 men one meal, leaving enough bran to feed eight pigs for one day. The produce of the single grain in the twelfth year would suffice to supply all the inhabitants of the earth with food during their lifetime.



THE GATLING GUN.—ELEVATING AND RANGING APPARATUS.

loosening of binder, *B*, allows the gun when on the carriage a lateral sweep of 90°, by means of lever, *L*, which is grasped at *E* with the left hand while the right hand turns the crank. On tripod or gunwale the gun can be swept around the full circle, or 360°. After loosening the screw, *G*, the gun can be raised or lowered, as a pressure under the handle, *E*, loosens the box, *D*. The breech can be raised 30° and lowered 15°, total 45°. By removing the hand at any desired point the spring fastens the gun, or the handle can be pressed down.

For more absolute security when at target shooting, or when a certain aim must be retained, the screw, *G*, is fastened. Both binder, *B*, and screw, *G*, are used to secure the gun when traveling on the carriage. By means of this fixture a man may follow moving objects with an accurate fire, or also shoot from the deck or tops of a vessel when rocking at sea.

The tripod has been rendered more secure by braces, which prevent the legs from moving in until the center of the braces is raised in folding the legs together.

The elevating and ranging lever, shown on the guns in the front page engraving, are made after the model of 1879.

The gun rests in the swivel in the same manner as in Figs. 2 and 3, and the same binder is employed.

The lever is a plain one, on which slides a box fastened by a pivot bolt to the breech of the gun. Against the side of the lever in slide or box a friction shoe is fitted, which is held in its position in the box by a heel on each end. On the rear end of the lever there is a tapering handle, on which fits the socket of a yoke, which may be easily put in place or removed, and it is fastened by a taper pin. A leather strap which passes under the socket of the yoke is slung over the

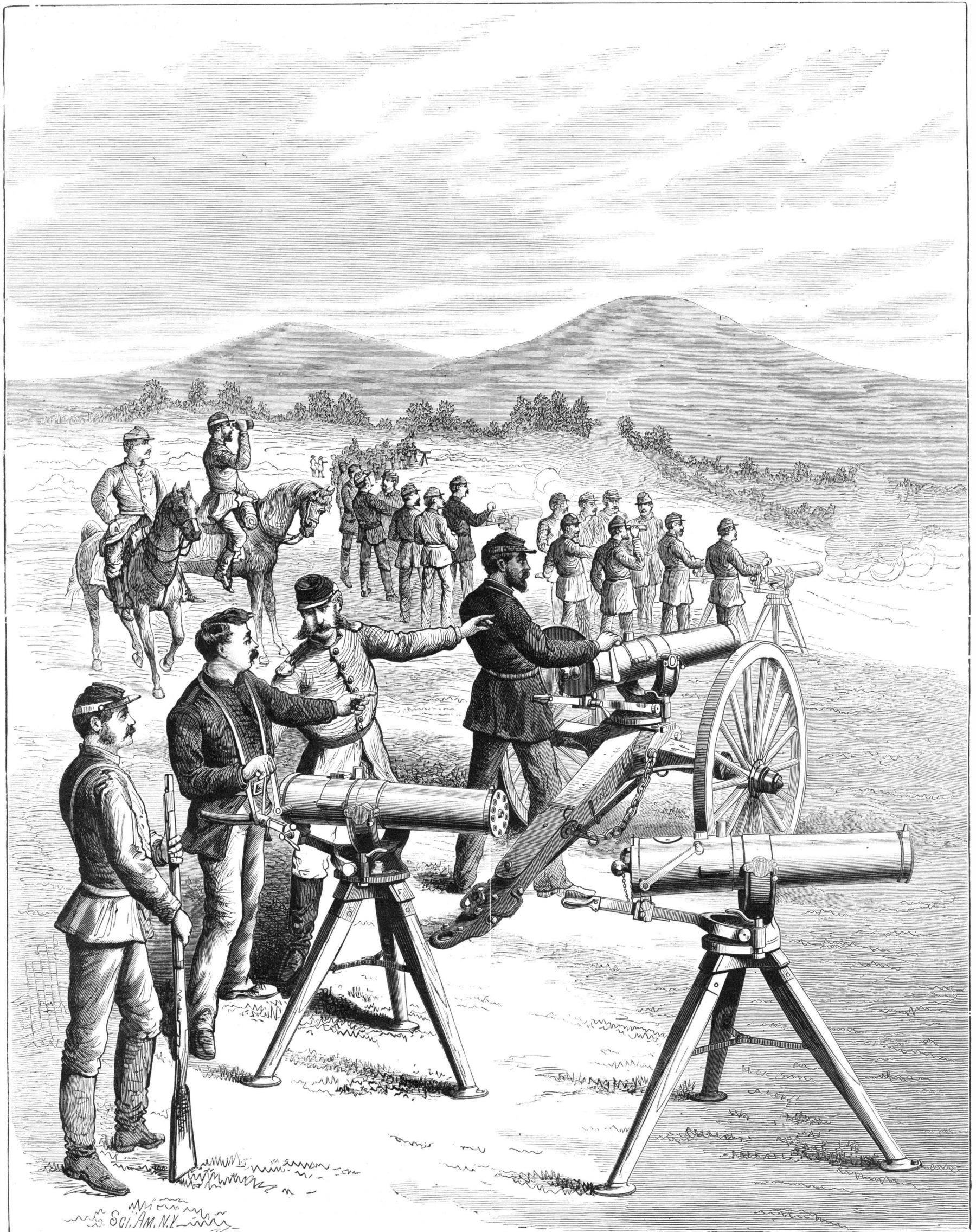
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THE NEW MODEL GATLING GUN.—(See page 370.)