2 Sheets—Sheet 1.

F. E. SCHULTZE.

Machine-Gun.

No. 208,203. Patented Sept. 17, 1878.

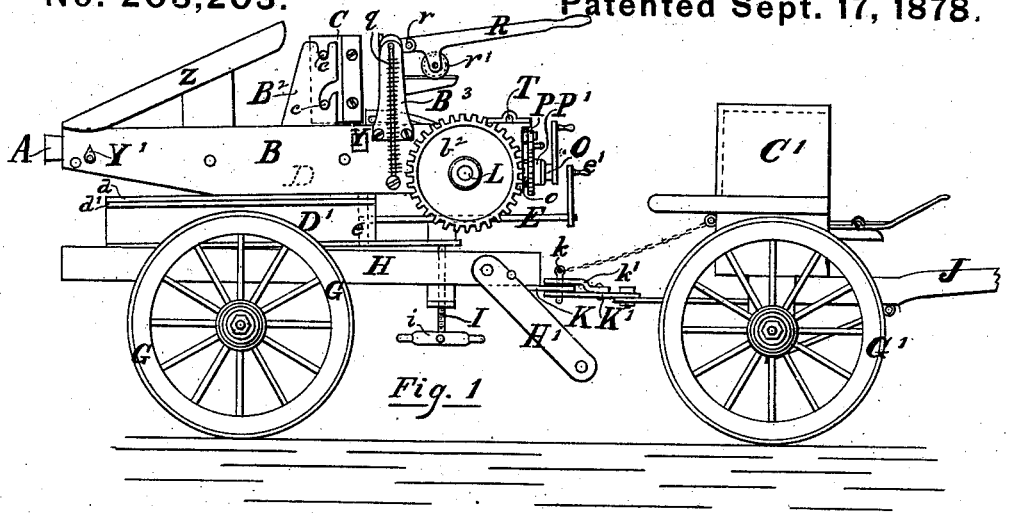

Fig. 1

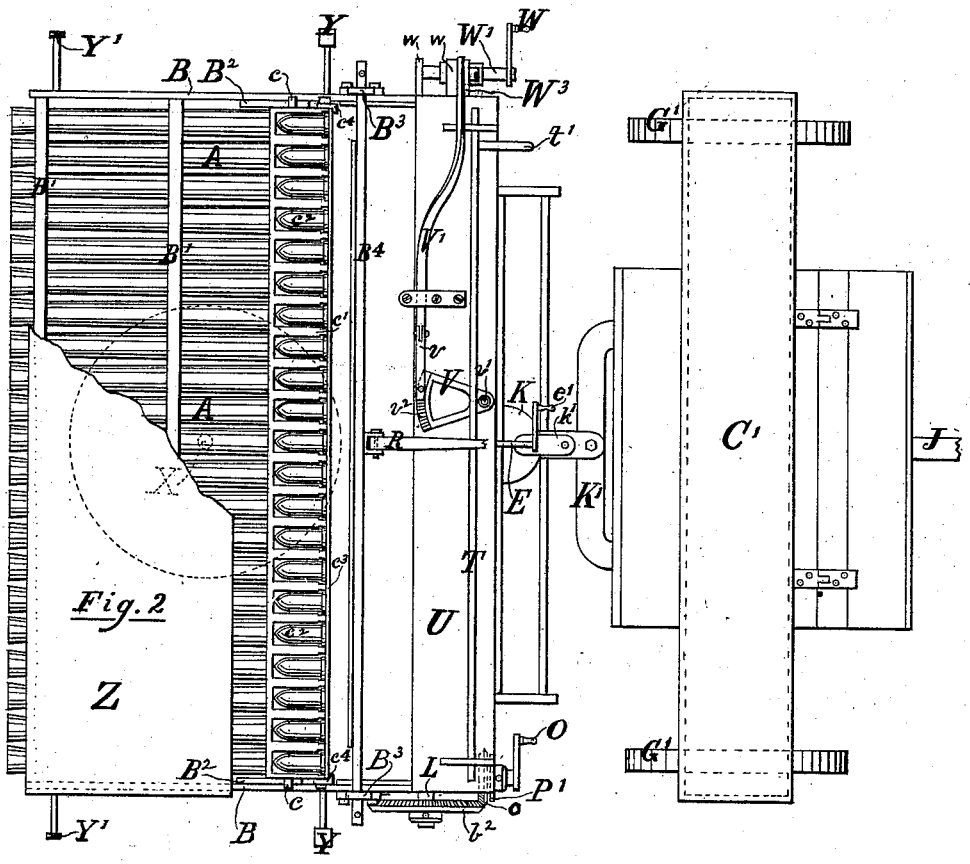

Fig. 2

Witnesses.

J. B. Thurston

J. A. Colton

Inventor.

Frederick E. Schultze

By his attorney

M. Randolph

2 Sheets—Sheet 2.

F. E. SCHULTZE.

Machine-Gun.

No. 208,203. **Patented Sept. 17, 1878.**

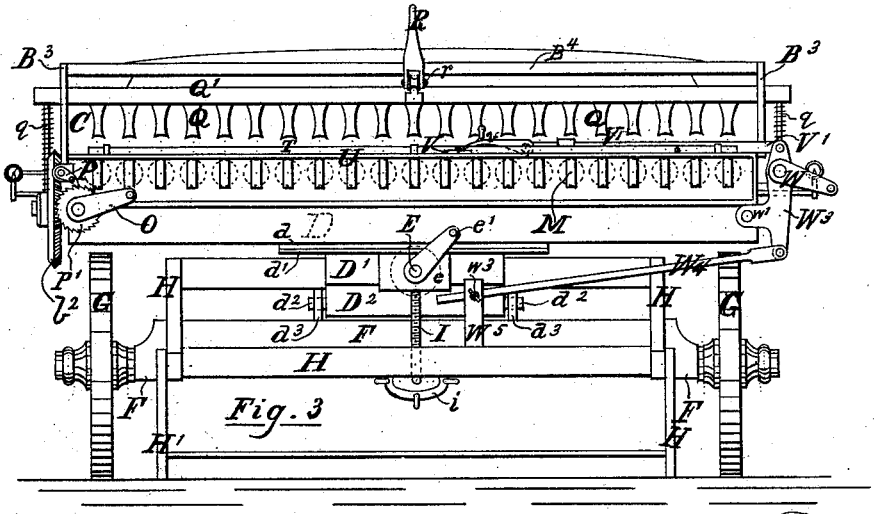

Fig. 3

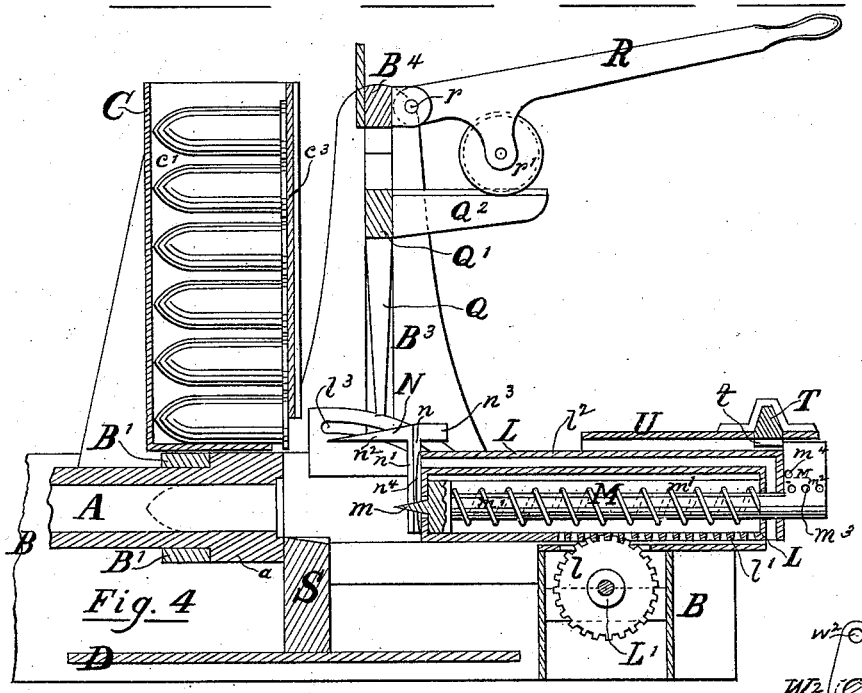

Fig. 4

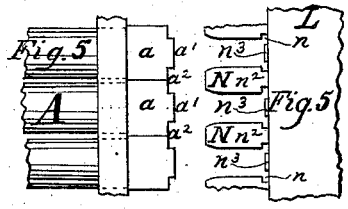

Fig. 5

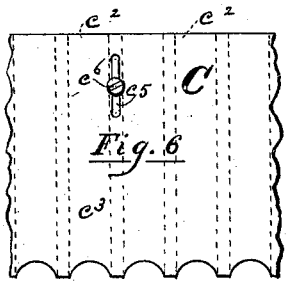

Fig. 6

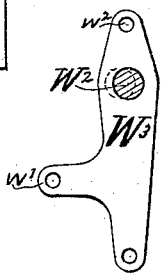

Fig. 7

Witnesses.

J. B. Thurston

F. H. Colburn

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By his attorney

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UNITED STATES PATENT OFFICE

FREDERICK E. SCHULTZE, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF HIS RIGHT TO FRANCIS ED. MEYER, OF SAME PLACE.

IMPROVEMENT IN MACHINE-GUNS.

Specification forming part of Letters Patent No. **208,203**, dated September 17, 1878; application filed December 27, 1877.

To all whom it may concern:

Be it known that I, FREDERICK E. SCHULTZE, of the city, county, and State of New York, have made certain new and useful Improvements in Rifle-Batteries; and I hereby declare the following to be a full and clear description of the same.

The object of this invention is to construct a new mounted rifle-battery in such a manner as to deliver its fire either in a right line or in horizontal radiating lines, at the pleasure of the operator.

The object of the invention is also to construct a rifle-battery formed of several small-bore guns, so that the barrels of the different guns may be separated sufficiently apart to prevent the barrels from becoming heated during the firing, and the different barrels will be fired successively instead of simultaneously, thereby greatly aiding in keeping them cool. A shield in front of the gunners will protect them from the enemy's fire, and the two men required to work the battery can, thus protected, easily discharge twenty thousand shots per hour from a battery of twenty-one guns, which is probably about the best number to place in one battery. These guns may be discharged continuously in one fixed direction, or they may be moved slowly and irregularly from side to side by the manipulation of the gunners without moving the carriage, or the machine may be so coupled up and arranged as to move the guns laterally from side to side in a vibrating movement automatically at the discharge of each individual gun, thus sweeping by direct and raking shots the whole range of the field in front of the guns.

The details and nature of the invention will be readily understood by the accompanying drawings, of which—

Figure 1 is a side elevation of one of the improved batteries attached to its limber. Fig. 2 is a general plan of the same. Fig. 3 is a rear end elevation of the battery detached from its limber. Fig. 4 is a sectional elevation of the breech of one gun, with the magazine, loading, and firing details. Fig. 5 is a sectional plan of the breech of three guns and the cartridge-holders. Fig. 6 is a sectional elevation of the rear part of ammunition-box or magazine, showing the arrangement for sliding the same up and down. Fig. 7 is an elevation of the eccentric-plate and eccentric, which is used to produce a continuous lateral movement of the guns during the firing operation.

The guns A will preferably be rifles of, say, sixty to eighty hundreths caliber, and, say, twenty-one of them (more or less) will be fixed in a frame, B B^1, so that their axial lines will all be in the same plane. The frame in which these guns are to be fixed will consist of side beams B and transverse beams B^1, all of which should be made of wrought metal and thoroughly framed and fastened together. The transverse beams B^1 will be mortised for the guns A, which will pass through them, and the guns will thus be held firmly in place, and they will be fixed in the beams B^1, so that there will be a distance of, say, one-eighth to one-quarter of an inch (more or less) intervening between two adjacent barrels, for the purpose of permitting air to circulate between the guns, and thereby keep them cool during action.

The breech of each barrel terminates in a rectangular block *a*, as shown best in Figs. 4 and 5, and when the barrels are assembled together in the frame B B^1 these blocks will rest behind and hold against the rearmost beam B^1. Vertical rabbets will be made in the sides of each of the blocks *a*, so as to form vertical projections a^1, extending a short distance behind the rest of the block *a*, as shown in Fig. 5. The width of each of the projections a^1 will be about equal to the bore of the barrel, so that when the metallic cartridges, which are to be used in this battery, are inserted in the bore of the gun, the flange of the cartridge, at its base, will project outward on both sides of the part a^1.

When the several barrels A are assembled together in the battery the rabbets in the blocks *a*, as above described, will form vertical grooves a^2 between each of two adjacent barrels, as shown in Fig. 5. The outer side of each outside gun of the series will, however, have only one-half of the groove a^2. The depth of the grooves a^2 will be equal to about twice the thickness of the flange or fulminate base

of the cartridge, so that were a cartridge inserted in the bore of any one of the barrels its flange or base would project into the open groove a^2, above described. The rest of the base of the block *a* is grooved or rabbeted out, as shown in Fig. 4, so as to allow the cartridge to set in the bore with its base flush with the rear end of block *a*.

The magazine C has trunnions *c* on its ends, which rest in seats prepared therefor in the fixed standards B^2, which are attached to the frame-pieces B. The seats for the trunnions *c* must be so constructed that the magazine can be easily seated in or removed therefrom by two men, one at either end of the case. The magazine C will be subdivided by the partitions c^1, which are fixed to its back into as many compartments, c^2, as there are guns in the battery, and these compartments will stand vertically over each of the guns to which they respectively belong. The rear side, c^3, of the magazine-box will be constructed so as to slide vertically in grooves c^4 at the ends of the box, and will be provided with slots c^5, as shown in Fig. 6, through which said slots holds or studs c^6 will be fixed to one or more of the partitions c^1, as may be required to hold the back securely to the magazine-box, while at the same time permitting a free vertical play of one or two inches, (more or less,) as may be required to facilitate the withdrawal of the shot or cartridges from the bottom part of the magazine, as will be presently explained. The bottom edge of the side c^3 will be scalloped out in the rear of each compartment c^2, as is shown in Fig. 6, so as to permit the withdrawal of the cartridges without the necessity of raising the said side c^3 up more than a short distance.

The gun-frame B B^1 is mounted on a carriage, D D^1, by means of which the position, range, elevation, &c., of the battery may be regulated and adjusted at will. A turn-table, d d^1, is interposed between the part of the carriage D which is fixed to the gun-frame and the sub-frame D^1, to which said carriage-frames the said turn-table plates are respectively secured. A central pivot, X, attached to one of the turn-table plates, and having its bearing in the other, forms a pivot on which the battery is turned around in any horizontal direction required.

A cogged wheel, *e*, (shown by the dotted lines in Fig. 3,) is arranged to gear into a cogged rack on the turn-table plate *d*, and turn it around with its battery, as desired, to any point within the field of its range, which movement laterally will be embraced within an angle of ninety degrees, (more or less.) The wheel *e* is placed upon and actuated by the shaft E, which has its bearings in or secured to the carriage D^1. The shaft E is to be turned as desired by the crank *e'*, which is placed just to the rear of and below the breech of the guns, so as to be within easy reach of the gunners by whom it is to be manipulated. The sub-carriage D^1 rests upon a transverse sill-piece, D^2, the ends of which form trunnions d^2, that rest in the sockets d^3, and so form an adjustable bearing for the gun-carriage D D^1 and the superimposed guns, by which construction the range of the guns may be elevated or depressed at pleasure.

The sockets d^3 are fixed to a transverse sub-sill, F, which forms in the case of a field-battery the axle, which has its bearings in the supporting-wheels G. It is only in naval or fixed positions that the piece F becomes a sub-sill. The trail-pieces H are also fixed to the sub-sill or axle F, as the case may be. The elevating-screw I has its nut fixed in a transverse piece of the frame-work of the trail, and the said elevating-screw is operated by the hand-wheel *i*, which is placed below the breech of the guns and within easy reach of the gunners. The top end of the elevating-screw rests against the bottom part of the carriage D^1, and by turning the screw I the range of the guns may be elevated or depressed in the usual manner, the carriage during its vertical adjustment moving easily on its bearing trunnions d^2. The rear ends of the trail-pieces H have jointed attachment pieces H', by which the adjustment of the trail may be more readily accommodated to circumstances of position.

When this battery is fitted up for field use, it will be provided with a limber constructed in much the same manner as the limber for ordinary field artillery, and it will be supported on the wheels G', have a pole, J, for the attachment of the horses, and an ammunition-chest, C', which will be constructed so as to accommodate a number of the magazine-cases C, each of which is to be filled with cartridges before going into action. When one magazine-case has become exhausted it is to be removed from its standards B^2 and returned to the chest C', and a full case taken from the limber and put in position ready for use in the standards B^2.

A coupling-plate, K, fixed to the gun-carriage is to be coupled, by means of the pin *k*, to the coupling-plate K' fixed to the limber when the battery is to be limbered up and thereby moved.

The operating or loading and firing mechanism of this battery is mounted on or attached to the rear ends of the gun-frame B B^1, and consists, principally, of a follower-frame, L, with its inclosed spring-hammers M and the attached cartridge-fingers N. The follower-frame L is arranged to slide forward and backward in suitable ways or bearings formed in the side beams B or attached to them. This follower-frame is moved up to or away from the breeches of the guns by means of the cogged wheels *l* and the cogged racks l^1, there being three or four (more or less) of the said wheels and racks, according to the width of the battery, which will coincide with the length of the said frame L. The wheels *l* are fixed to the shaft L', which has its bearings in the frame-pieces

B, and the said shaft is rotated by means of the bevel-gear wheels b^2 o, and the latter wheel is turned by the hand-crank O, so that by turning the said crank the aforesaid follower and its attachments will be moved up to or away from the ends of the guns, as described. The cartridge-fingers N consist of L-shaped pieces of metal, fastened to the front edge of the follower-frame L, with the attached sides of the said fingers fixed vertically to the said follower-frame, and the other arm of the piece N projecting horizontally to the front. The horizontal part of the piece N is wedge-shaped both in plane and elevation, as shown clearly in Figs. 4 and 5. At the rear or attached sides of the pieces N there are vertical rabbets or notches n, which extend the whole length of the said pieces, and form, in connection with the front edge of the follower-frame, grooves of a size sufficiently large to allow the base or flange of the cartridges to slide easily down through them. The body of the vertical part of the piece N is of just sufficient width to fill the space between two adjacent cartridges as they are drawn from the magazine, and when the follower is pushed up close to the breech of the guns, as it must be at the time of firing, the vertical arm n^1 of the finger-piece will enter the vertical groove a^2 immediately in front of it, as shown by the position of the parts in Fig. 5. At the same time the part n^1 is pressed into the groove a^2, as above described, the horizontal part n^2 of the said cartridge-finger will pass into the lower part of the magazine-case, just between the bottom of the said case and the bottom side of the lowest cartridge in the magazine.

From the foregoing description it is apparent that the positions of the several fingers N at the time they are in the bottom part of the magazine-box will be not directly below the several tiers of cartridges, but between them, and as the said finger-pieces N are pushed into the box under the side piece c^3 the pointed front end and top slope of the arms n^2 enable the said finger-pieces to be easily pushed forward by the follower, so as to raise the side piece c^3, and at the same time to slide easily in under the cartridges until, at the limit of the stroke, the flanges at the base of the cartridges will drop into the grooves n, and thereby be held fast between the said fingers, which fingers will then draw the engaged cartridges rearward out of the magazine under its sliding rear side c^3, the sliding side being meanwhile held up sufficiently high by the arms n^2 (on which for the time being it rests) for the engaged cartridges, but none others, to pass out of the magazine. The two end fingers of the series have heel-pieces n^3 extending far enough back of the outside of piece c^3 to hold the said piece c^3 up in position at the time of the completed forward movement of the follower, at which time all of the bodies of the pieces N will have passed beyond the inside line of the sliding side c^3, which would then be at liberty to drop down and stop the operation of the battery but for the heel-pieces n^3, which for the time being hold up the said slide.

The follower and its attachments having been pushed forward far enough for a set of cartridges to be caught in between the fingers N, as above described, will then be withdrawn by turning the crank O, the pawl P meanwhile being held up off the ratchet-wheel P′, so as to allow the reverse movement of the follower. When the follower shall have been moved back to the limit of its stroke, the cartridges which have been drawn by the movement out of the magazine will be found to be directly below a set of rammers, Q, one rammer to each cartridge. These rammers are fixed to the bottom side of a transverse bar, Q^1, which is fitted into and moves in vertical slots in the standard-guides B^3, which are attached to the side pieces B.

The rammer-bar Q^1 extends far enough outside of the guide-pieces B^3 to be engaged by the compression-springs q, which habitually hold the rammer-bar with its rammers up to the upward limit of its stroke, so that the cartridges may be drawn under them.

A lever, R, fulcrumed at r to a lug projecting from and attached to the cross-bar B^4, carries on its under side a sheave or roller, r', which is arranged to travel on a horizontally-projecting bar, Q^2, which is fixed to the bar Q. When the lever R is pressed down, the sheave or roller r' will act against bar Q^2, and thereby the rammers will be pressed down on the cartridges which are held between the fingers N, and the cartridges will be pressed down by the movement, so that their front ends will rest on the stop-bar S, directly in the lines of the prolongations of the bores of the barrels A. The follower L will then be moved forward again by turning the crank O, as before, and the cartridges which have been placed behind the gun-barrels by the previous movements, as above described, will then be forced home into the barrels, and held there by the pressure of the follower, which will act as a breech-block during the firing of the charge, the pressure of the follower against the cartridges being maintained during this part of the operation by the action of the pawl P engaging in the ratchet P′, the said ratchet-wheel being fixed upon the shaft O′, which carries the gear-wheel o and the actuating-crank O.

After the cartridges shall have been discharged by the means presently to be described, the follower L will be again withdrawn by turning the crank O, and at this retreat it will draw with it the old shells of the exploded cartridges, which have all the time been held by their base-flanges in the grooves n; and also at the same time and movement a new set of cartridges will be drawn out of the magazine, in the same manner as has before been described.

When the rammers are next used to press down a set of cartridges to the stop-blocks S,

they will force the old shells below them out at the bottoms of the grooves n, and so discharge them out of the way of future operations; and so on, the alternate forward and backward movement of the follower L will draw the cartridges out of the magazine, push them into the guns, and then draw the spent shells out of the guns, the rammers Q being used, as described, to press the cartridges down to the stop S, and then, also, the old shells out of the way.

When the new cartridges are pressed down to the stop S, only the leaden bullet at the front end of the cartridge will rest upon the seat or stop, thus leaving plenty of clear room at the rear of the said stop for the case of the spent cartridge to be moved down and out of the way.

In place of a single sheave or roller, r', the lever R may be fixed to a rock-shaft, which may carry several rollers or sheaves, acting against as many rails on the rammer-bar, so as to avoid a springing of the parts and a consequent unequal placing of the cartridges preparatory to sliding them into the gun-barrels. The top plate l^2 of the follower is allowed a slight vertical motion at its front edge, and has trunnions on its ends, near the said front edge, which move in the sloping slots of the guides l^3, so as to raise the said front edge of the plate l^2 up to near the center of the bottom tier of cartridges in the magazine, so that the edge of the plate l^2 may form an abutment, against which the cartridges may rest at the time they are drawn from the magazine.

The top plate l^2 is L-shaped, as shown in Fig. 4, the back edge of it turning downward from its horizontal part and forming the rear side of the follower-frame. A pin, m^4, passes through the heels of the hammer-piece behind the vertical part of the plate l^2, and when the front edge of the said plate l^2 is raised up, as above described, the rear end or vertical part of it will exert a leverage against the pin m^4, and thereby move it with the hammer backward when the hammers are not cocked and the follower is thrown forward, and by this movement the needle m will be moved back out of the way of the cartridges just as well as if the hammers were held back by the shooting-bar T.

Small elliptical springs n^4 are fixed to the front edge of the follower-frame between each pair of fingers N, and arranged to press lightly against the cartridges while they are in the grooves n, so as to hold the cartridges against accidental slipping out at the bottoms of the grooves.

The sliding follower-frame will also carry a set of spring-hammers, M, as many hammers as there are gun-barrels, and one of them placed directly behind and in the prolongation of the bore of each of the gun-barrels. The front end or head of each of these hammers will carry a needle-point, m, which will pass through an aperture in the front plate of the follower, beyond which it will extend a sufficient distance to strike into the fulminate of the cartridge when the follower is pressed up tightly to the cartridge in the gun-barrel.

A spring, m^1, coiled around the hammer-shaft within its seat in L will habitually throw the hammers forward. The rear end of the hammer rod or shaft will extend a short distance behind the follower-frame, and terminate in a projecting tail-piece, m^2, the top edge of which will extend above the top edge or side of the follower-frame, so as to be engaged by the cocking-stud t, which projects from the bottom edge of the shooting-bar T. As both ends of the hammer-piece are larger than the central shaft around which the spiral spring m^1 is coiled, it will be necessary to drill some holes m^3 through the part m^2, so that the spring may be turned through the said holes, and so screwed to its position on the piece M. In lieu of this arrangement, however, one of the ends of the hammer-piece may be screwed on to the shaft part, and then the end riveted down, so as to hold the parts firmly together.

The shooting-bar T rests upon the top side of the transverse rest-plate U, the ends of which are fixed to the side plates B. There are as many of the cocking-studs t upon the bottom side of the said shooting-bar as there are hammers M—one stud to each hammer. The plate U is slotted below the bar T, so as to permit the studs t to extend through the said plate U and far enough below it to engage the projections m^2 of the hammers.

When the follower-frame is moved backward to the limit of its motion, the shooting-bar T will be moved across its bed, so that each of the hammers will be caught behind its respective stud t, and the whole of the guns of the battery will thereby be cocked, and remain so, when the follower-frame is moved up to the breeches of the guns. Then, when the shooting-bar is moved sidewise across the machine, the studs t will be disengaged from the hammer-heels m^2, and the moment the hammer is thus released its spring will throw it violently forward, and the needle m will strike into the cartridge, and the charge will thereby be fired in the usual way of percussion-cartridges.

The hammer-heels m^2, the cocking-studs t, and the bar T are so constructed and arranged that the pieces m^2 will not all be released simultaneously, but successively, from left to right, so that the guns A will be fired in succession, and thereby be kept cool during action. This is accomplished by making the parts m^2 and t of unequal widths, or the spaces between one or the other of the parts m^2 or t of unequal widths, and arranging the studs t upon the bar T in such positions as to produce the desired result. The bar T is moved so as to cock the hammers by means of the knob t', which may be seized by the gunner, and then pushed to one side, as required. The bar T will be moved so as to disengage the hammers, and fire the pieces by means of the graduated lever V, the pawl v, bar V', and the crank W. The graduated lever V is fulcrumed to the

plate U by means of the pivot-screw v^1, and passes thence through a slot in the bar T, as shown in Fig. 2. The lever V lies flat upon the plate U, and its free end is considerably wider than its fulcrumed end, and is provided on its top face with a graduated toothed rack, v^2, which rack is segmental in plan, the segment being described from the pivot-screw v^1. A pawl, v, is pivoted to the end of the sliding bar V′, as shown in Figs. 2 and 3, and when the said bar is to be moved back to cock the hammers this pawl will be raised up off of its rack, as shown by the dotted lines in Fig. 3. The cogs or teeth on the rack v^2 are to be just as numerous as the barrels to be discharged, and the arrangements of the parts are to be such that the pawl will move the rack v^2 and the bar T just far enough at one motion to disengage one of the hammers M, and then fall back into the next notch in the rack v^2, and move it forward, and so on, until all the hammers shall have been released and all the pieces fired. The rod or bar V′ and its pawl v are to be operated by the turning of the crank W, (in the manner presently explained,) and the adjustment of the parts, each to the other, is such that for every revolution of the crank W one gun will be discharged. The crank W is placed upon the shaft W^1, which has its bearings in the blocks w, which are attached to the side of the beams B. The shaft W^1 has an eccentric, W^2, as shown in Fig. 7, which said eccentric moves in and actuates the eccentric bar W^3. The eccentric bar is fulcrumed by its side lug w^1 to the frame B, and the top end of the said bar W^3 is coupled by the pin w^2 with the outer end of the bar V′, so that by turning the crank W the eccentric W^2 will move the bar W^3, and with the top end of it the attached bar V′ just sufficiently to move the pawl v and rack v^2 the required distance to discharge one barrel, in the manner clearly described. The rod W^4 is coupled by a pivot-pin to the bottom end of the eccentric-plate W^3, and the other or free end of the said rod passes through a slot in the top end of the post W^5, which said post is erected upon the trail H. A set-screw, w^3, in the said post may be screwed up against the rod W^4, and the rod will thereby be held securely in place in the post W^5, or when the screw is left loose the rod W^4 will be free to slide through its slotted bearing in the post. When the screw is tightened upon the rod, so as to hold it fast, the rod will hold the bottom end of the eccentric-plate W^3, and the said eccentric-plate will then be held fixed at two points by the lug w^1 and by the rod W^4, and by turning the crank W, the shaft W^1 being confined within its bearings in the blocks w, which are attached to the frame B, the said frame and with it the guns A will be given a slight vibrating movement in a lateral direction, and this movement will be continued at each revolution of the crank W, and thus the guns will be made to deliver a raking fire, changing from side to side at the discharge of each gun. This deflection and spread of the fire from the guns will be of the utmost importance when shooting at a moving enemy, as in Indian warfare, or against cavalry.

When it is desired to shoot straight ahead without the spreading fire the screw w^3 will be left loose, when the crank W will only work the shooting-bar T; otherwise, by turning the crank W, when the screw w^3 is tightened, the simple movement of the said crank W will simultaneously, and by the one movement, discharge the guns, and also move them laterally, so as to spread their fire.

The gunners can easily aim the battery by means of the sights Y and Y′, which are attached to the sides of the frame B.

A shield, Z, of sheet metal is placed slopingly over the guns—lower in front and higher at the rear, as shown in Figs. 1 and 2, so as to shield the gunners from the enemy's fire. The shield will be supported by attachments resting on the frame B.

Having described my invention, I claim—

1. The follower L, with its attachments N, constructed and arranged as described, so as to draw the cartridges from the magazine, place them in position in the breech of the gun, and then, after the discharge of the cartridges, to withdraw their spent cases from the guns and throw them away, substantially as and for the purpose set forth.

2. The spring-hammers M, seated in sliding ways within the follower-frame L, and provided with heel-pieces m^2, in combination with the cocking-studs t of the shooting-bar T, so as to fire the guns A successively, one at a time, substantially as described and set forth.

3. The L-shaped fingers N, each having a vertical leg, n^1, and a tapering or wedge-shaped horizontal arm, n^2, with a rabbet, n, in the back corners of the vertical leg, arranged so as to form, in connection with the follower-frame L, vertical grooves for catching and holding the cartridges while they are drawn out of the magazine and placed in the gun-barrels and the spent cases withdrawn therefrom, substantially as described and set forth.

4. The follower L, the holding-fingers N, and the retaining-springs n^4, combined and arranged as and for the purpose set forth.

5. The guns A and their carriages B B^1, mounted on a central pivot, X, and the firing mechanism T and V′, connected with the crank W and with the gun-carriage by means of the rod W^3 and the post W^5, the whole combined and arranged so as to vibrate the guns laterally by the turning of the said crank, substantially as and for the purpose set forth.

6. The shooting-bar T, provided with cocking-studs t of unequal widths, or placed at unequal distances apart, so as to hold the hammers M in such a manner as to disengage them in succession, as and for the purpose set forth.

7. The lever V, with its graduated rack, the pawl v, the connecting-bar V′, the eccentric-plate W^1, and the crank W, combined and ar-

ranged together and with shooting-bar T, so as to move the said shooting-bar the required distance to fire one gun at a time and the whole battery in succession by the continuous revolutions of the crank, as and for the purpose set forth.

8. The eccentric-plate W^3, pivoted to the frame B by the lug w^1, and adjustably attached to the relatively-fixed post W^5 by the rod W^4, the said eccentric-plate W^3 being actuated by the eccentric shaft W^1, which is supported in bearings w fixed to the frame B, so as to move only the bar V′, which is attached to the plate W^3 when the rod W^4 is left loose in the said post W^5, or arranged to move both the bar V′ and the frame B when the rod W^4 is fixed to the post W^5, substantially as described and set forth.

9. The crank W, its eccentric-shaft W^1, the eccentric-plate W^3, with its fixing-rod W^4, and the post W^5, combined and arranged as and for the purpose set forth.

10. The follower-frame L, with its plate t^2, provided with trunnions arranged to move in sloping slots in guide b^3, as and for the purpose set forth.

11. The magazine C, divided into vertical compartments by means of the partitions c, and having its rear side, c^3, arranged to slide vertically in its ways c^4 and on the guide c^5, as and for the purpose set forth.

FREDERICK E. SCHULTZE.

Witnesses:
M. RANDOLPH,
J. B. THURSTON.