

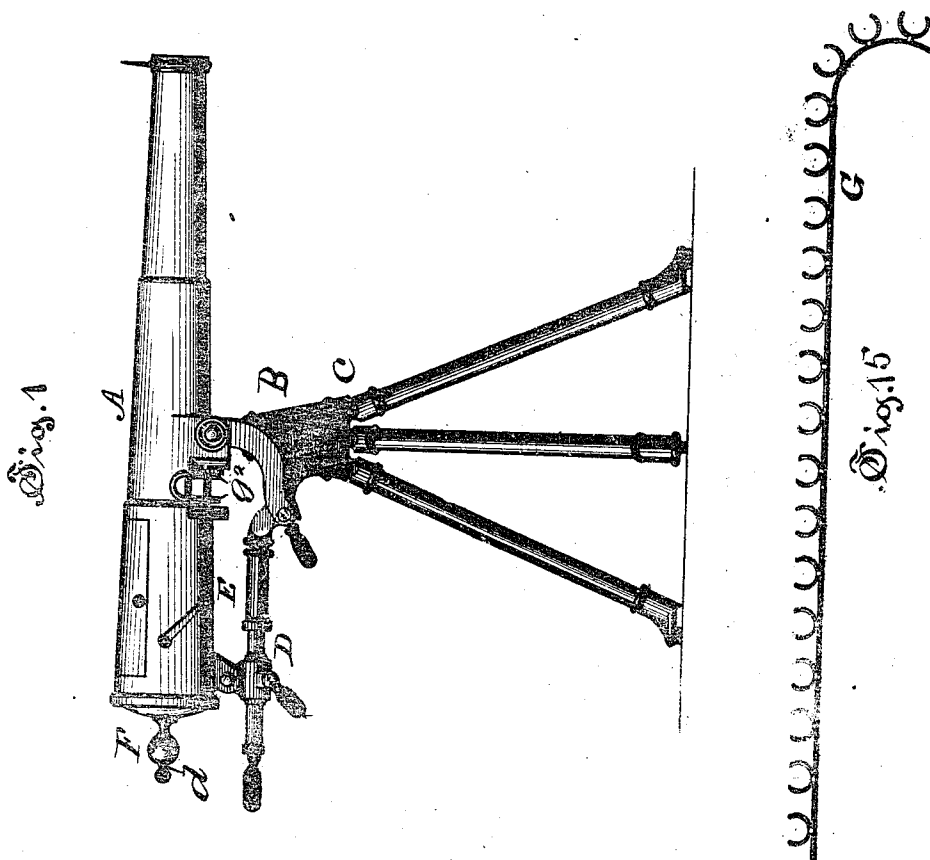
(No Model.)

F. M. GARLAND.
MACHINE GUN.

5 Sheets—Sheet 1.

No. 479,799.

Patented Aug. 2, 1892.



Witnesses:

J. P. Wright
Frank Richter

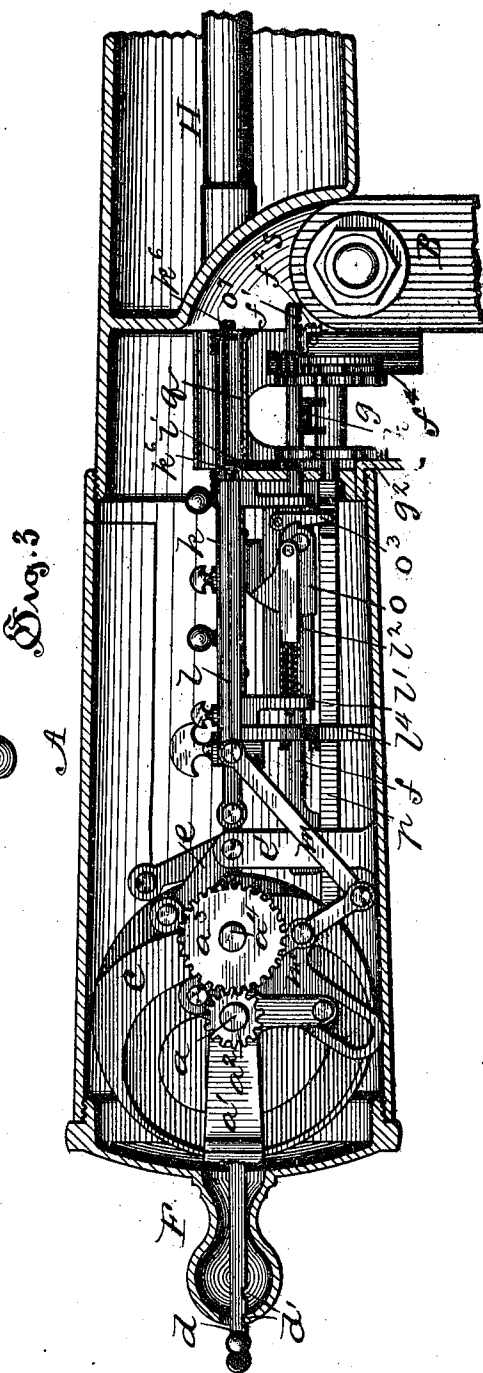
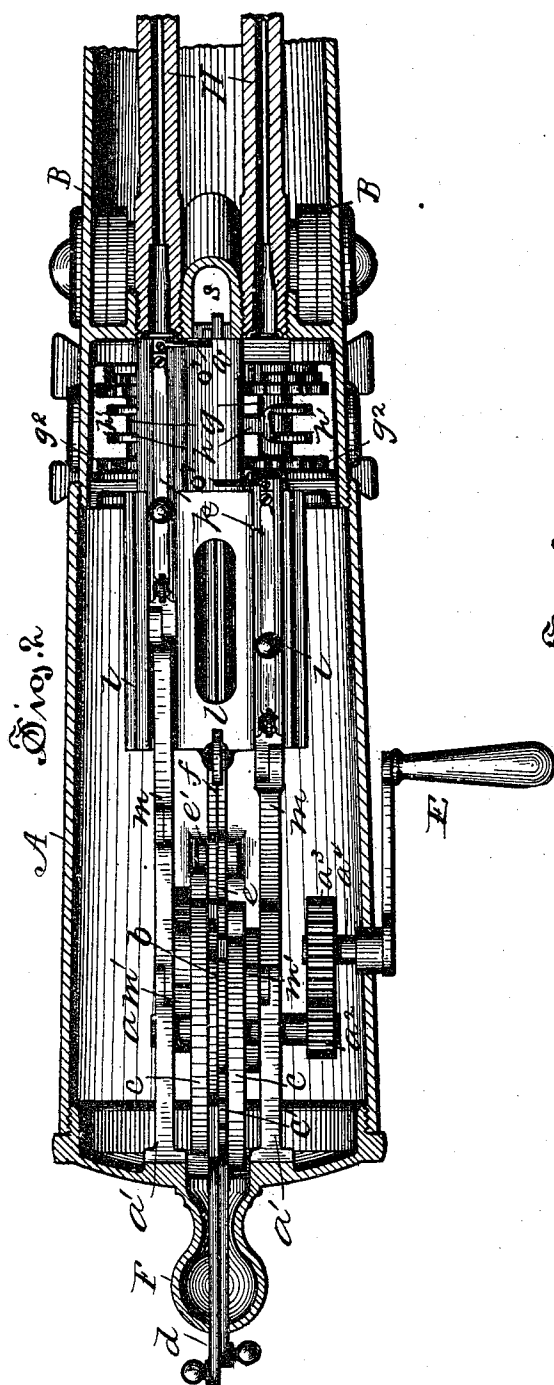
Inventor,

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F. M. GARLAND.
MACHINE GUN.

No. 479,799.

Patented Aug. 2, 1892.



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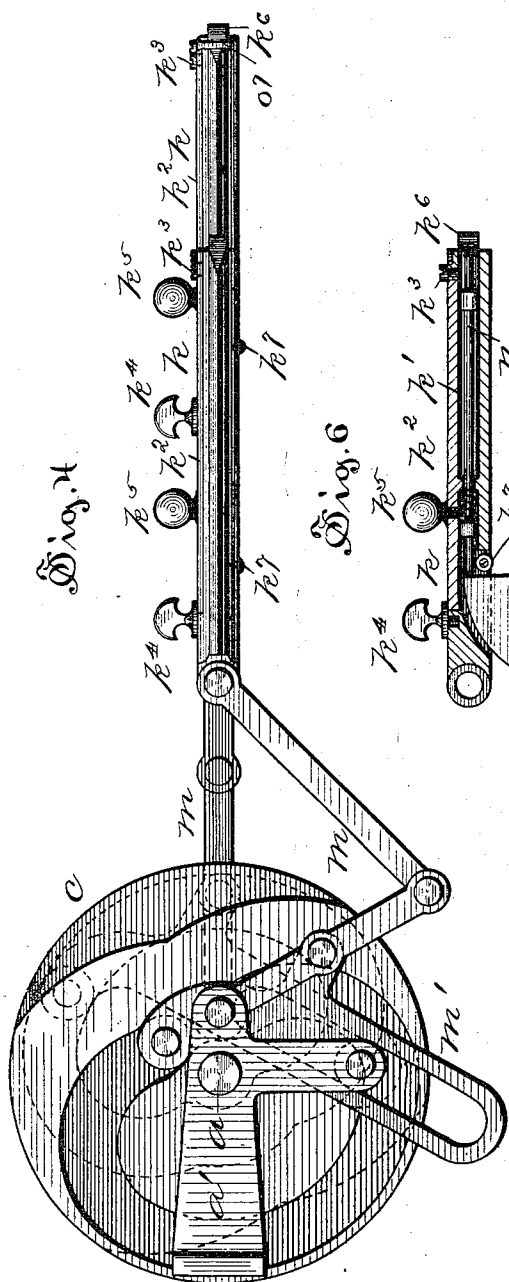


Fig. 4

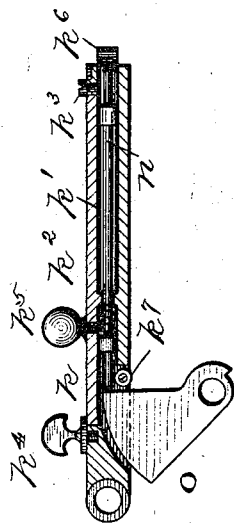


Fig. 6

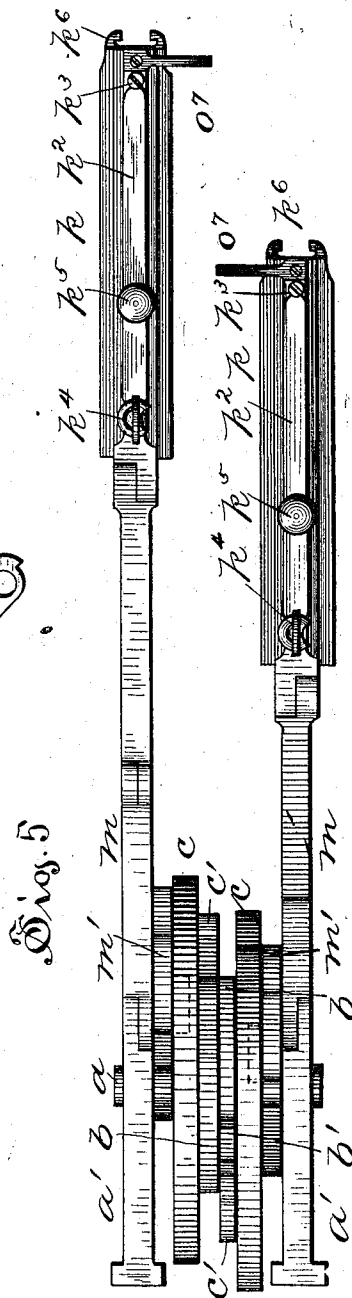


Fig. 5

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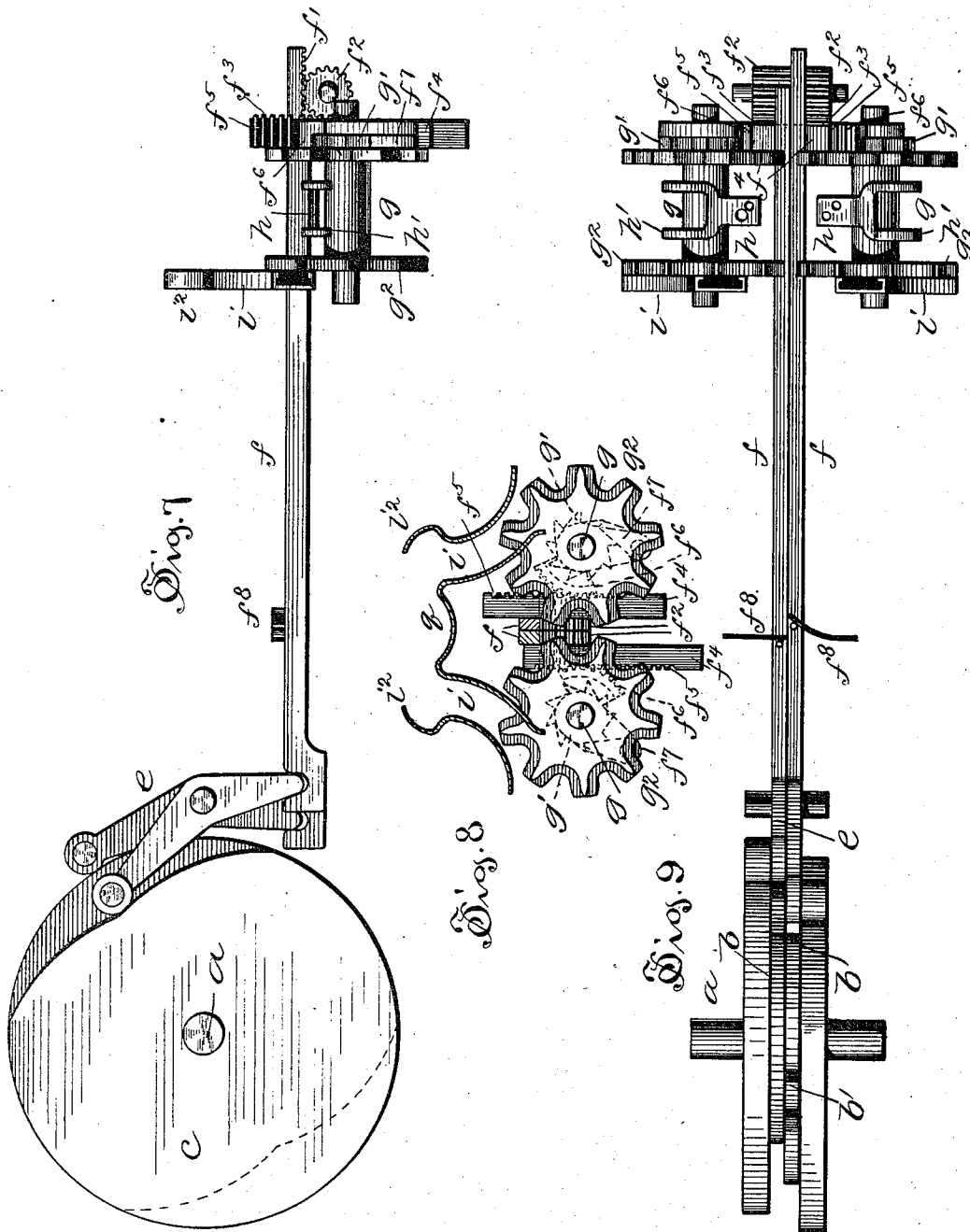
(No Model.)

5 Sheets—Sheet 4.

F. M. GARLAND.
MACHINE GUN.

No. 479,799.

Patented Aug. 2, 1892.



Witnesses:

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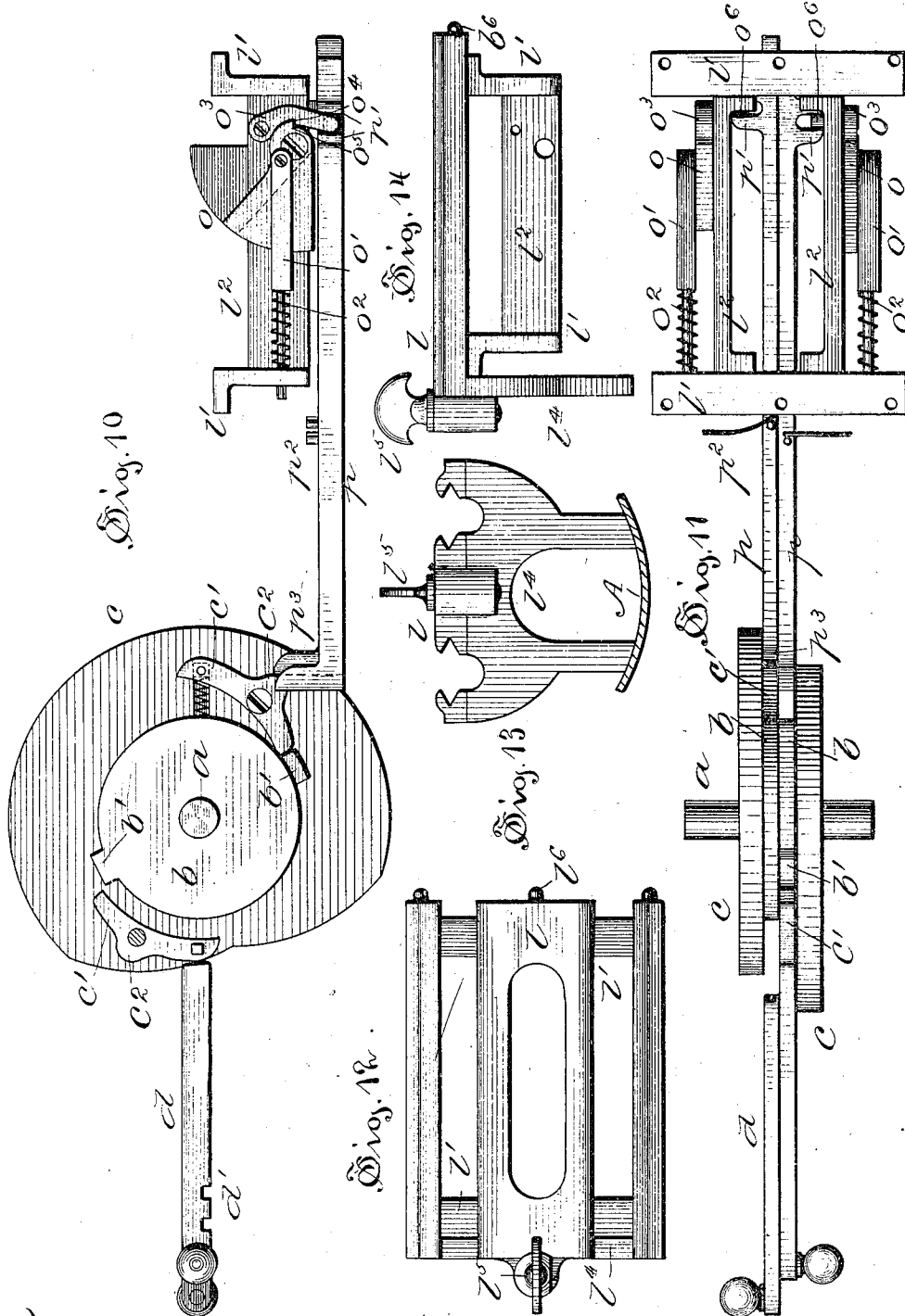
(No Model.)

5 Sheets—Sheet 5.

F. M. GARLAND.
MACHINE GUN.

No. 479,799.

Patented Aug. 2, 1892.



Witnesses:

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UNITED STATES PATENT OFFICE.

FRANK. M. GARLAND, OF NEW HAVEN, CONNECTICUT, ASSIGNOR OF TWO-THIRDS TO EBENEZER B. BEECHER, WILLIAM A. FOSKETT, AND FREDERICK P. NEWTON, OF SAME PLACE, AND THOMAS H. SHERMAN, OF WASHINGTON, DISTRICT OF COLUMBIA.

MACHINE-GUN.

SPECIFICATION forming part of Letters Patent No. 479,799, dated August 2, 1892.

Application filed October 10, 1891. Serial No. 408,321. (No model.)

To all whom it may concern:

Be it known that I, FRANK. M. GARLAND, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Machine-Guns, of which the following is a full, clear, and exact specification.

This invention relates to the class of machine-guns in which the cartridges are positively automatically fed to the barrels from a belt; and the object is to provide a gun of this class in which one or both of the barrels may either be discharged slowly or with great rapidity, the mechanism being simple, so that it may be run at high velocity without liability to get out of repair.

Referring to the accompanying drawings, Figure 1 is a side elevation of the gun. Fig. 2 is an enlarged plan of the butt of the gun with the shell cut in central section. Fig. 3 is a similar side view. Fig. 4 is a side view of the spindles and operating mechanism. Fig. 5 is a plan of the same. Fig. 6 is a vertical section of one of the spindles, showing a firing-pin. Fig. 7 is a side view of the feeding mechanism. Fig. 8 is a view of the feeding-wheels looking toward the front. Fig. 9 is a plan of the feeding mechanism. Fig. 10 is a side view of the hammer and operating mechanism. Fig. 11 is a plan of the same. Fig. 12 is a plan of the spindle and hammer supporting frame. Fig. 13 is a face view of the same. Fig. 14 is a side view of the same. Fig. 15 is an edge view of a portion of a cartridge-belt used in this gun.

In the views, the letter A indicates the shell, which is preferably formed of cylindrical tubes or castings. This shell, having a portion that can be lifted to permit access to the mechanism, is supported by trunnions held in the yoke of any suitable mount B upon any common carriage C, provided with any desired form of elevating and depressing device D.

Near the butt of the gun, supported by plates a' , attached to the base, is a shaft a , having a pinion a^2 , that meshes with a gear a^3 on the shaft a^4 of the crank E, Figs. 1, 2,

and 3. Two disks or ratchets b , each having a notch or tooth b' , are secured to the middle of the shaft a , and outside of these the shaft loosely supports a pair of cam-blocks c , bearing on the inside spring-pawls c' , adapted to engage the teeth on the disks, so that the cam-blocks are driven by the rotation of the disks. Two bolts d , having handles on the exterior, pass through the case F , so as to engage and release the pawls from the disks when pushed inward from the exterior. These bolts are provided with notches d' to hold them at either limit of their movement, and when they are both out the rotation of the crank drives the cam-blocks, but when pushed in the pawls are released from the disks and the cam-blocks remain stationary, Figs. 2, 3, 10, and 11.

In engagement with the cam-surfaces on the peripheries of the blocks c are rolls on levers e , pivoted to a post e' , the opposite ends of which levers engage slides f , that pass forward side by side to a point near the trunnions, where they bear racks f' , that mesh with pinions f^2 . These pinions are wider than the slides f , and they also mesh with racks f^3 on vertically-moving posts f^1 , that have other racks f^5 in mesh with segmental gears f^6 , loosely mounted upon shafts g , supported longitudinally on each side of the gun by parts of the shell. Leaves on the segmental gears f^6 bear pawls f^7 , that engage with oppositely-turned ratchets g' , secured to the shafts g . These shafts also bear feed-wheels g^2 , the peripheries of which are pocketed to receive the cartridges which are to be fed into the gun. Adjacent to the rear of the feed-wheels are placed guides i , adapted to receive the heads of the cartridges as they pass up the feed-wheels. The slides f are moved forward by the levers e as the cams rotate and are returned by springs f^8 , that are at one end attached to the shell or a portion of the frame upon each side, while the opposite ends press rearwardly against studs projecting from each of the slides, this reciprocation oscillating the pinions f^2 , which reciprocate the vertical racks f^3 and f^5 , that oscillate the segmental gears f^6 , bearing the pawls f^7 , so that through the

ratchets g' the feed-wheels g^2 are rotated alternately with an intermittent movement.

The cartridges, which are placed in the spring grasping-arms of a flexible belt G , are started on each side of the gun by placing the first cartridge in a pocket of the feed-rolls, and as they are drawn up the arms h' of the comb h , secured to the shell by any suitable support, strip the belts from the cartridges, allowing the belts to pass out through the open bottom of the shell, while the cartridges are fed up the guideways i into the grasp of the spindles k , Figs. 2, 3, 7, 8, and 9. These spindles, which slide freely in ways in the plates l , are reciprocated by means of toggle-levers m , pivoted to the spindles and to the plates a' at the base of the shell. These levers are opened and closed by means of toggle-links m' , having rolls that project into cam-grooves in the face of the blocks c , the cams being so timed that the toggles are opened and closed to alternately reciprocate the spindles. The spindles have longitudinal mortises k' , in which the firing-pins n are placed, the top of the mortises being covered by plates k^2 , at one end passed under and held down by the head of a screw k^3 , while the other end is held under the edge of a button k^4 with an eccentric or cut-away base. These cover-plates are provided with handles k^5 , so that when the buttons are turned a quarter of a revolution the plates may be lifted and the firing-pins removed for repairing, cleaning, or disabling the gun, Figs. 4, 5, and 6. The forward ends of the spindles are mortised and have jaws k^6 to receive and hold the rims of the cartridges. The mortised ends of the spindles at the backward limit of their movement rest directly over the guides i' , and as the cartridges are pushed up the top one is pushed into the grasp of the jaws of the spindle, which then is moved forward by the operation of the cams and toggles and carries the cartridges into the barrels H , which are secured to a partition across the shell in any desired manner and are preferably surrounded with water to prevent undue heating. The plates l , in which are the ways for the spindles, are secured to the upper edge of transverse plates l' , joined by longitudinal plates l^2 , and this frame thus formed is held in place at one end by means of dowel-pins l^3 , that pass into sockets in the transverse support l^3 , permanently secured to the shell, while the opposite end is held to the support l^4 by means of a button l^5 , the base of which is eccentric or so cut that a quarter-turn will release the plates and allow the whole frame bearing the spindles and the hammers to be lifted from the interior and removed for cleaning, repairing, or disabling the gun, Figs. 2, 3, 12, 13, and 14.

The hammers o , which are pivoted to the plate l^2 below the spindles, are normally forced upward, so as to come in contact with the firing-pins by rods o' , thrust forward by springs o^2 , and are forced downward to the

cocked position by means of rolls k^7 , Fig. 6, secured to the spindles in the path of the hammer as the spindles move rearward. The hammers are held cocked by means of triggers o^3 , pivoted to the plates l^2 , having sear-notches o^4 to engage cocking-notches o^5 on the hammers. On the end of the triggers are studs o^6 , that engage arms p' on slides p , that lie side by side below the center of the shell, Figs. 2, 3, 10, and 11. These slides p are moved forward at the proper time by means of projections c^2 on the backs of the pawls c' , secured to the cam-blocks, which come in contact with the ends p^3 of the slides to release the hammers and allow them, under the impulse of their springs, to strike the firing-pins, Figs. 2, 3, 6, 10, and 11. Springs p^2 , that are at one end attached to the shell or a portion of the frame upon each side, while the opposite ends press rearwardly against studs projecting from each of the slides, force the slides backward, so that the triggers will be in position to engage and hold the hammers when again cocked by the rearward movement of the spindles, which withdraw the discharged shells which they grasp from the breech of the barrels. When the next following cartridges are fed upward, the discharged shells are pushed out of the grasp of the end of the spindles and fall over into the trough q , supported between the spindles. The shells are guided so as to fall into the trough by the guard i^2 on the end of the guide i , Figs. 7 and 8, and when the spindles again move forward to place other cartridges in the barrels the discharged shells are pushed by means of arms o^7 , projecting from the spindles over the trough, into the opening s , made through the shell between the trunnions, and through this the exploded cartridges fall to the ground.

The cartridges in the belts are fed into the gun on either side by the feed-wheels, and after the belts have been stripped from them they pass from the wheels through the guides, up which they are pushed by the following cartridges to the spindles, which place and hold them in the barrels until discharged. The spindles then withdraw the exploded shell, and the next cartridge which is pushed up crowds the used shell out of the way and occupies its position, and while the new cartridge is being placed in the barrels the exploded one is pushed along by the spindle so as to fall through the opening to the ground. If one of the barrels becomes disabled, by pushing in one of the bolts that project through the caseable one of the pawls is released from the rotating disk and all of the mechanism appurtenant to that barrel remains stationary, allowing the mechanism appurtenant to the other barrel to run unincumbered by the mechanism of the disabled barrel. If it is desired to remove the spindles and hammers, a quarter-turn of the holding-button so releases the frame that holds them that the hand may be inserted through the opening and the whole lifted out, while if one of

the firing-pins becomes disabled or disarranged a quarter-turn of the thumb-screw that holds its cover-plate allows the plate to be lifted and the pin removed.

5 The mechanism is simple. There are but two cam-blocks and the action is all positive, as is the feeding of the cartridges. Thus the gun is not liable to get out of order and the firing mechanism may be instantly removed
10 for repairing or disabling the gun, and either one of the barrels may be fired independently of the other rapidly or slowly.

I claim as my invention—

1. In a machine-gun, in combination with
15 the loading and firing mechanism, feeding mechanism consisting of a pair of wheels having pocketed peripheries mounted upon shafts on each side of the shell beneath the barrels, the shafts being connected with and alternately rotated by the driving-shaft, guides
20 adjacent to the feed-wheels, adapted to receive the heads of the cartridges as they pass from the wheels, and combs attached to the shell adjacent to the wheels for stripping the cartridges from the belts, substantially as specified.
25

2. In a machine-gun, in combination with the loading and firing mechanism, feeding mechanism consisting of a pair of wheels having pocketed peripheries mounted upon shafts
30 on each side of the shell beneath the barrels, the said shafts bearing ratchets, pawls for rotating the ratchets, racks for driving the pawls, pinions for reciprocating the racks, slides bearing racks for driving the pinions, and levers
35 in contact with cams upon the driving-shaft for moving the slides, substantially as specified.

3. In a machine-gun, in combination, cams
40 loosely mounted upon the driving-shaft, ratchets adjacent to the cams, with one piece secured to the shaft and the complementary pieces secured to the cams, bolts movable into and out of the path of the pawls, feeding
45 mechanism connected with and driven by the cams, loading mechanism reciprocated by the cams, and firing mechanism released by the rotation of the cams, substantially as specified.

50 4. In a machine-gun, in combination, cams bearing pawls loosely mounted upon the driving-shaft, ratchet-disks secured to the shaft adjacent to the cams and adapted to engage the pawls, bolts projecting through the shell
55 for releasing the pawls from the ratchets, feeding mechanism connected with and driven

by the cams, loading mechanism reciprocated by the cams, and firing mechanism released by the rotation of the cams, substantially as specified. 60

5. In a machine-gun, in combination, cams bearing pawls loosely mounted upon the driving-shaft, ratchet-disks secured to the shaft adjacent to the cams, adapted to engage the pawls, bolts projecting through the shell for
65 releasing the pawls from the ratchets, feeding mechanism consisting of wheels mounted upon shafts intermittently rotated through the means of levers oscillated by the cams, reciprocating loading-spindles, jointed levers operated by the cams attached to the loading-spindles,
70 firing mechanism, and slides moved into and out of contact with the firing mechanism by contact with the pawls upon the cam-blocks as they revolve, substantially as specified. 75

6. In combination, in the herein-described machine-gun, reciprocating spindles, cams on the driving-shaft connected by levers with the spindles, each of said spindles having a longitudinal mortise, a firing-pin held in said
80 mortise, plates covering said mortise, and a button having an eccentric base for holding each plate in place, substantially as specified.

7. In combination, in the herein-described machine-gun, reciprocating spindles, cams on
85 the driving-shaft connected by levers with the spindles, each of said spindles having a longitudinal mortise, a firing-pin held in said mortise, a cocking-roll secured to the spindle, and a hammer in the path of the cocking-roll,
90 whereby when the spindles are moved rearward the hammers are cocked, substantially as specified.

8. In combination with the shell of the herein-described machine-gun, a frame consisting of plates having ways for supporting the reciprocating spindles and plates for supporting the hammers and triggers, said frame being connected with the shell at one end by means of dowel-pins that pass into sockets in
100 a part secured to the shell and at the opposite end by a button, a support rising from the shell holding the button, reciprocating spindles supported by the ways, and hammers and triggers supported by the frame, where-
105 by a turn of the button releases the frame, allowing it with the hammers and triggers to be freely removed, substantially as specified.

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Witnesses:

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