

F. L. BAILEY.
MACHINE-GUN.

No. 173,751.

Patented Feb. 22, 1876.

Fig:1

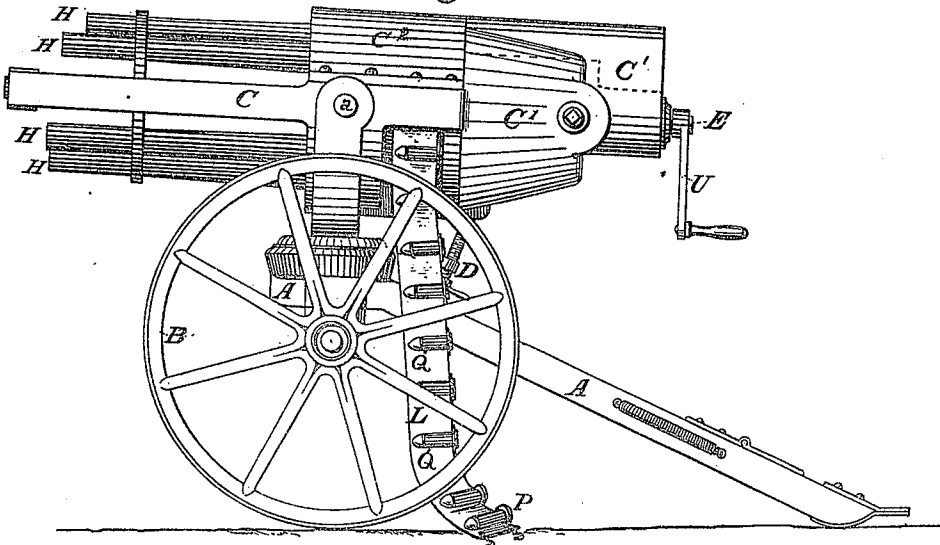


Fig. 2

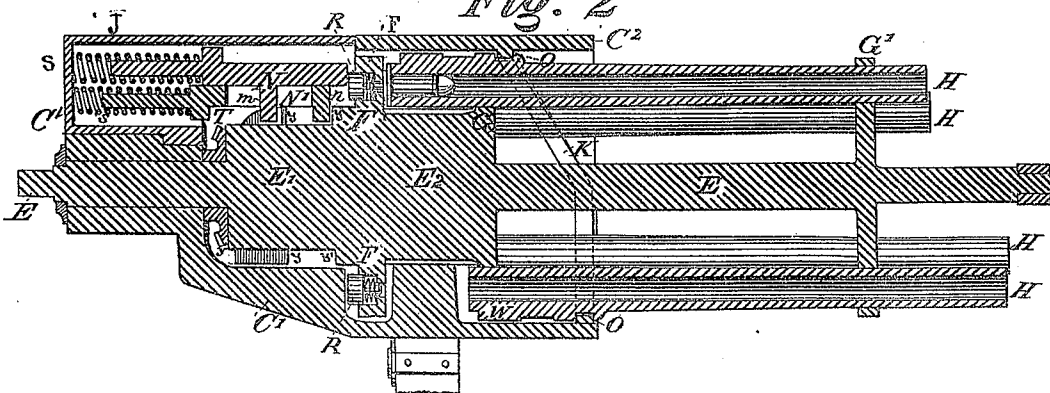


Fig. 3

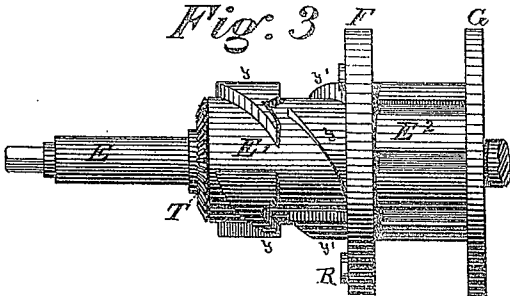


Fig. 4

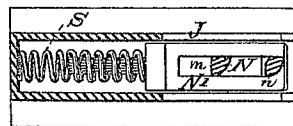
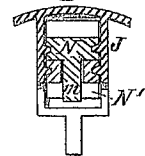


Fig. 5



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IMPROVEMENT IN MACHINE-GUNS.

Specification forming part of Letters Patent No. **173,751**, dated February 22, 1876; application filed December 8, 1875.

To all whom it may concern:

Be it known that I, FORTUNE L. BAILEY, of Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Improvement in Machine-Guns, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

The object of my invention is to simplify the firing mechanism of machine-guns, so that said mechanism shall not be easily broken or disordered, and so, also, that in case of injury thereto it may be readily removed for repair or renewal, and quickly replaced by duplicate parts, if required, even in action, effectually avoiding thereby a permanent disabling of the gun because of accident to this portion of its mechanism. It consists in the use of a pair of spring-actuated hammers, secured to the fixed casing of the gun, so as to be readily detached therefrom, and which are superimposed, so as that each may strike the same point, and which are cocked and released by means of a series of spiral cams formed about the rear end of the revolving shaft which carries the barrels, or upon a drum secured thereon, said cams being so arranged with reference to the barrels as that the hammers shall be alternately cocked as each barrel approaches the line of sight, and shall be released to explode the cartridge the instant the barrel is in line for firing, the movement of cocking and releasing each hammer being repeated on the approach of every alternate barrel.

In the accompanying drawings, Figure 1 is a side elevation of my improved gun duly mounted; Fig. 2, a central longitudinal vertical section thereof; Fig. 3, a detached view in elevation of the rear end of the rotating shaft, illustrating the rotating cams operating the hammers, and, also, the drum carrying the cartridge-belt. Fig. 4 is a bottom view of the hammers and case, with that portion of the case inclosing the springs cut away in section; and Fig. 5 is a vertical transverse section of the hammer-case and hammers in a line through the cocking-pin of the upper hammer.

A is the gun-carriage, constructed and mounted in the usual manner. C C is a horizontal frame, supported and swung in suitable bearings upon the carriage A by means of

the usual trunnions *a a*; D, the elevating-screw, by means whereof the gun is sighted; C¹ C², a casing secured to the rear portion of the frame, to inclose and protect the loading and firing mechanism of the gun; E, a shaft, extending from end to end, longitudinally, through the center of the frame C, and which revolves freely in suitable bearings provided therefor in the cross-bars at front and rear of said frame. H H are a series of gun-barrels, arranged to be supported at equal distances apart around the central shaft E, parallel thereto, by means of flanges G G', projecting radially from said shaft E, the one near its forward end to support the front ends of the barrels, the other sufficiently far back to support the rear ends. The barrels pass through circular apertures in the flanges G G', and have free longitudinal play therein, and each is fitted with a feather or key, W, engaging a slot in the rim of the encircling aperture, to prevent the frame from turning upon its axis. A third flange, F, formed on the shaft E in the rear of the second flange G, serves as a breech-block, to support the base of the cartridges when the barrels are loaded and pressed back against it, ready for firing.

A longitudinal reciprocating movement is imparted to each barrel, when the shaft E revolves, by means of a continuous cam rib or guide, K, (see Fig. 2,) formed upon the inner face of the inclosing casing C², so as to project therefrom inwardly around its entire circumference and engage a notch, O, formed in a lug or extension of the feather W, projecting from each barrel. (See Fig. 2.) This fixed guide rib or cam K is made to follow such inclined and parallel lines around the inner circumference of the casing as that each barrel, in revolving about the shaft, will, as it approaches the highest point, be carried back toward the breech-flange F, and, after having passed the central point in line over the shaft E, will gradually recede from the flange a distance exceeding the length of the cartridge to be used.

The butt-ends of the barrels are left open, and are each bored out to form a chamber for the reception of a metallic cartridge, fitting closely therein. The cartridges Q Q are supplied to the gun by means of a belt, L, by

which they are carried, and over which they are supported by holders P on the edge thereof. This belt is carried over a drum, E², formed for the purpose between the flanges F G, so that the cartridges shall successively fall into line with the gun-barrels, each in proper position to be covered and inclosed by the butt-end of the barrel as the barrel is carried back against or toward the breech-flange F. Each cartridge becomes thus inclosed within the breech of the barrel, and its base is forced back and supported against the rear flange by the time the barrel has attained its position in line for firing; but as the barrel continues its revolution about the axis of the shaft after being fired, it is gradually withdrawn from the empty cartridge-case, which remains upon the belt. The belt may be made endless, and loaded cartridges substituted for the empty shells as fast as they pass down from the drum; or the belt may be made in sections, and a section of loaded cartridges be hooked or otherwise fastened upon one side whenever a section of the empty shells is removed from the other.

The cartridges are exploded, as the barrels attain the proper position for firing, by means of two sliding reciprocating superimposed hammers, N N', secured within a case, J, within the gun-casing C¹, in line over the rear portion of the shaft E, the shaft being enlarged at this point to constitute a drum, E¹, which shall carry cams upon its circumference, by means whereof the two hammers are alternately cocked and released.

These hammers consist each of a plate or bar, the two being arranged to slide longitudinally, one over the other, in parallel ways formed in the inclosing-case J. (See Fig. 5.) The lower plate N' is slotted centrally and longitudinally, and a lug or cocking-pin, m, projects through it from the bottom of the upper plate N. A similar lug or pin, n, projects downward from the front end of the lower plate, the two pins being left to project an equal distance beyond the bottom face of said lower plate. (See Fig. 2.)

Loose firing-pins R R are fitted in the flange F to play through it opposite each gun-barrel, and the front ends of the hammers strike these pins when brought in range therewith and released. The rear end of each hammer engages with a powerful spring, S, fixed in the case J, which operates to carry the hammer forward against the firing-pin in line therewith.

The hammers N N' are alternately forced back or cocked, and the springs thereby retracted and compressed, by means of a double set of spiral cams, y y', formed upon the periphery of the drum E¹ on the shaft E. (See Figs. 2 and 3.) The hammers are so arranged and fixed with reference to the revolving cams y y' as that their projecting cocking-pins m m shall engage said cams. The pitch of the cams y is so determined and the length and position of each so adjusted as that at the moment one

hammer is released to strike the firing-pin the other will be already partially cocked. The two hammers are thus made to strike alternately upon the firing-pins as each is brought into proper position. As the cams, firing-pins, cartridges, and gun-barrels all revolve in unison upon a common shaft, the action of the cams in producing a blow of the hammer to explode the cartridge must, necessarily, be fixed and invariable, occurring always at the precise moment when the barrel has embraced and covered the cartridge and reached the proper line for firing.

The case inclosing the hammers is made separate from the gun-casing, being confined therein by secure fastenings, which admit, however, of ready detachment for the purpose of removing the hammers. If either hammer should break or become disabled in action, a duplicate may be quickly substituted therefor. The barrels H H, cams y y', and firing-pins R R admit also of ready detachment and replacement, so that damage to any working part of the gun admits of prompt repair by the substitution of a duplicate part, or by the removal and repair of the affected part.

The shaft E is made to revolve by means of a crank, U, Fig. 1, fixed either in the rear end thereof or upon a side shaft carrying a spur-wheel meshing into a bevel-wheel, T, at the rear end of the cam-drum E¹. (See Figs. 2 and 3.)

The revolution of the shaft E, bringing each gun-barrel successively into position for firing, carries it back over a cartridge, which is brought into line therefor by means of the belt L passing over the drum E². At the same time it forces back one of the hammers N until, at the very instant the barrel reaches its proper alignment with the sights of the gun, and the cartridge is completely inclosed and forced back for support against the breech-flange F, said hammer, passing the end of the cam y, is released and forced by the spring with a violent blow against the loose firing-pin R, to drive it against the cartridge and cause its explosion. So soon, however, as the hammer is thus released, its cocking-pin m is engaged by the cam next approaching, which gradually forces it back again, so that it may repeat its blow. By the use of the twin hammers and double cams, the hammers may be cocked in turn, and the firing of the barrels maintained thereby in succession by means of spiral cams, which have an easy pitch, so that their movements in cocking and releasing the hammers are performed smoothly and without strain.

A single hammer, N, may be employed in the stead of the twin hammers N N', to be cocked and released by a single series of cams, y, so as to fire each barrel in turn, and I contemplate the use of a single hammer, substantially in manner as described; but in such case the cams would need be of a rapid pitch, and the movement be more or less violent.

All the movements of this my improved gun

in loading, firing, and removing the empty cartridge-shells from the barrels are produced automatically, with regularity, precision, and great rapidity, by the simple revolution of the shaft E, and may be thereby continued without cessation indefinitely, or until the barrels become overheated.

I claim as my invention—

1. Detachable spring-actuated reciprocating hammers N N', secured to the fixed casing of a machine-gun, and combined with its revolving barrels and shaft, and with spiral cams

formed upon said shaft, substantially as and for the purpose herein set forth.

2. Loose firing-pins R R, combined with the revolving flange F, shaft E, and stationary reciprocating hammers N N' of a machine-gun, substantially as and for the purpose herein set forth.

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In the presence of—

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WALTER V. LIPPINCOTT.