No. 709,301. Patented Sept. 16, 1902.

E. M. CAPPS.

MACHINE GUN.

(Application filed Nov. 1, 1901.)

(No Model.) 8 Sheets—Sheet 1.

Fig. 1.

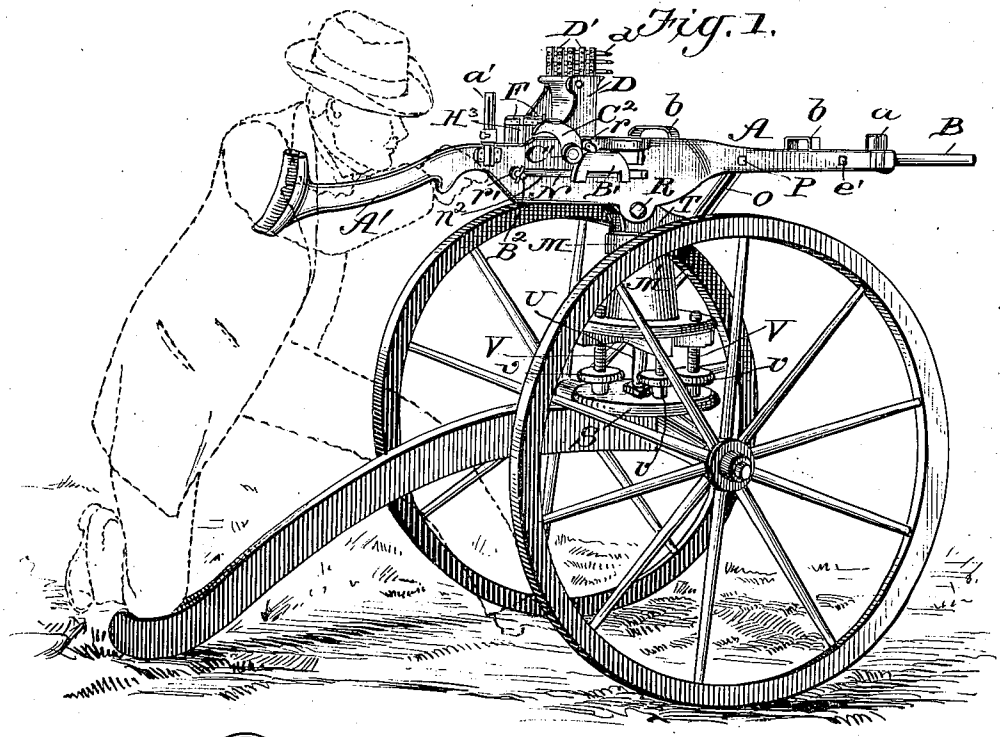
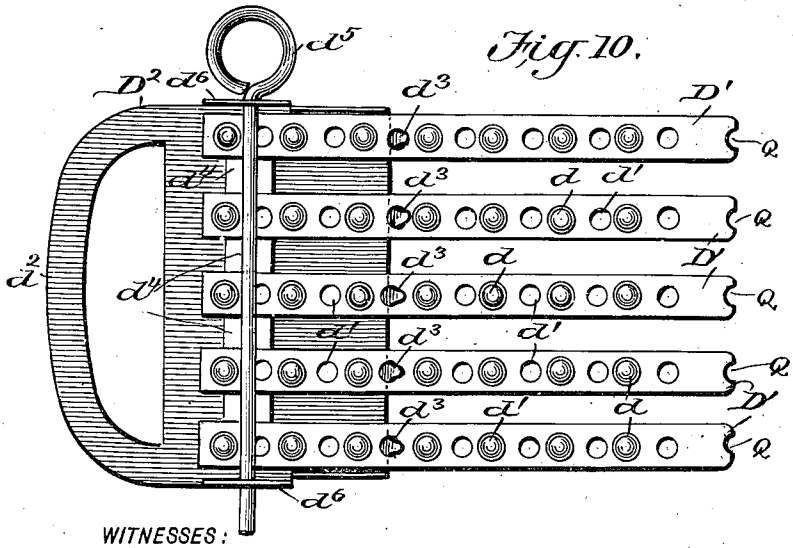


Fig. 10.



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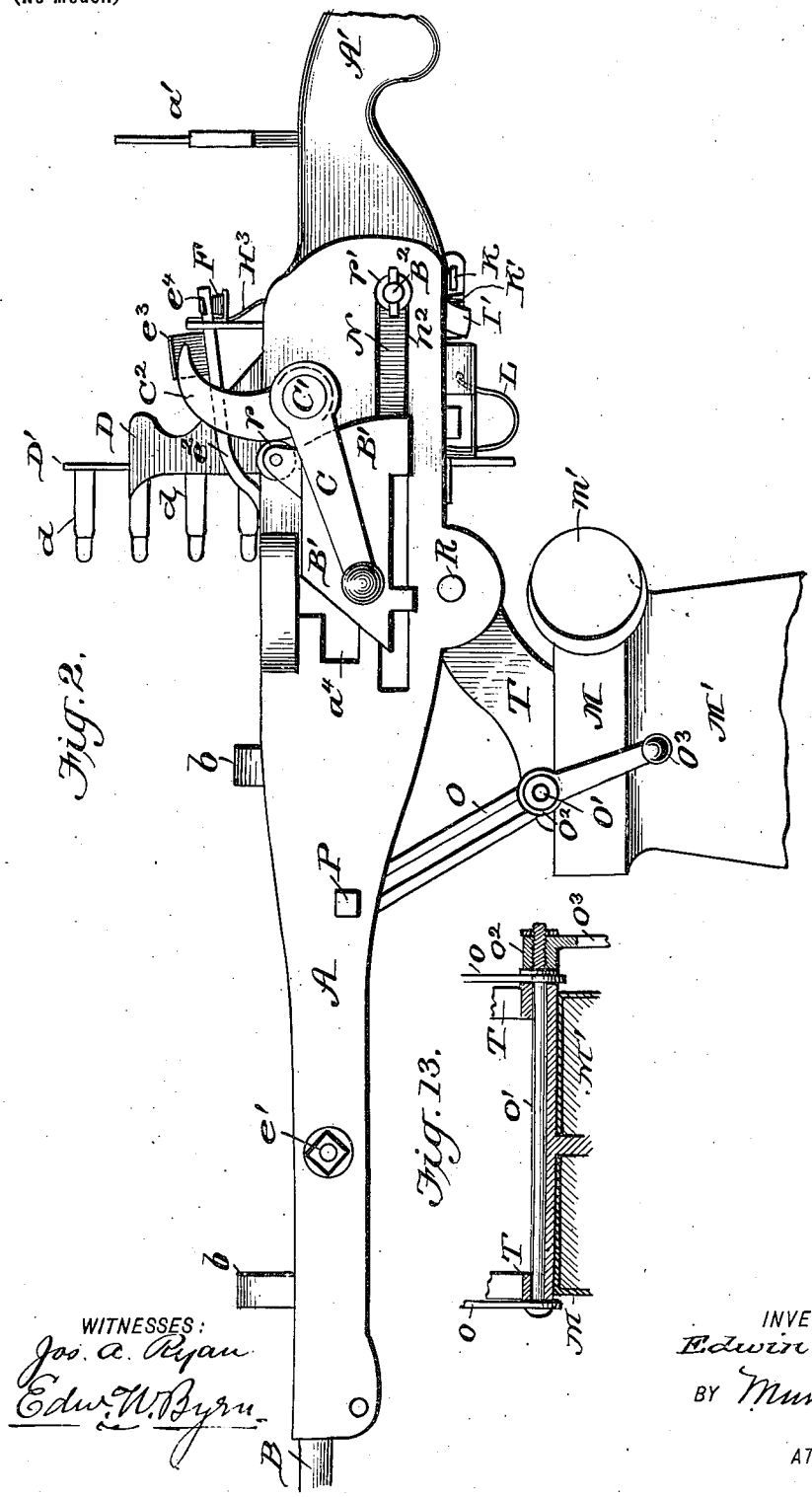


Fig. 2.

Fig. 13.

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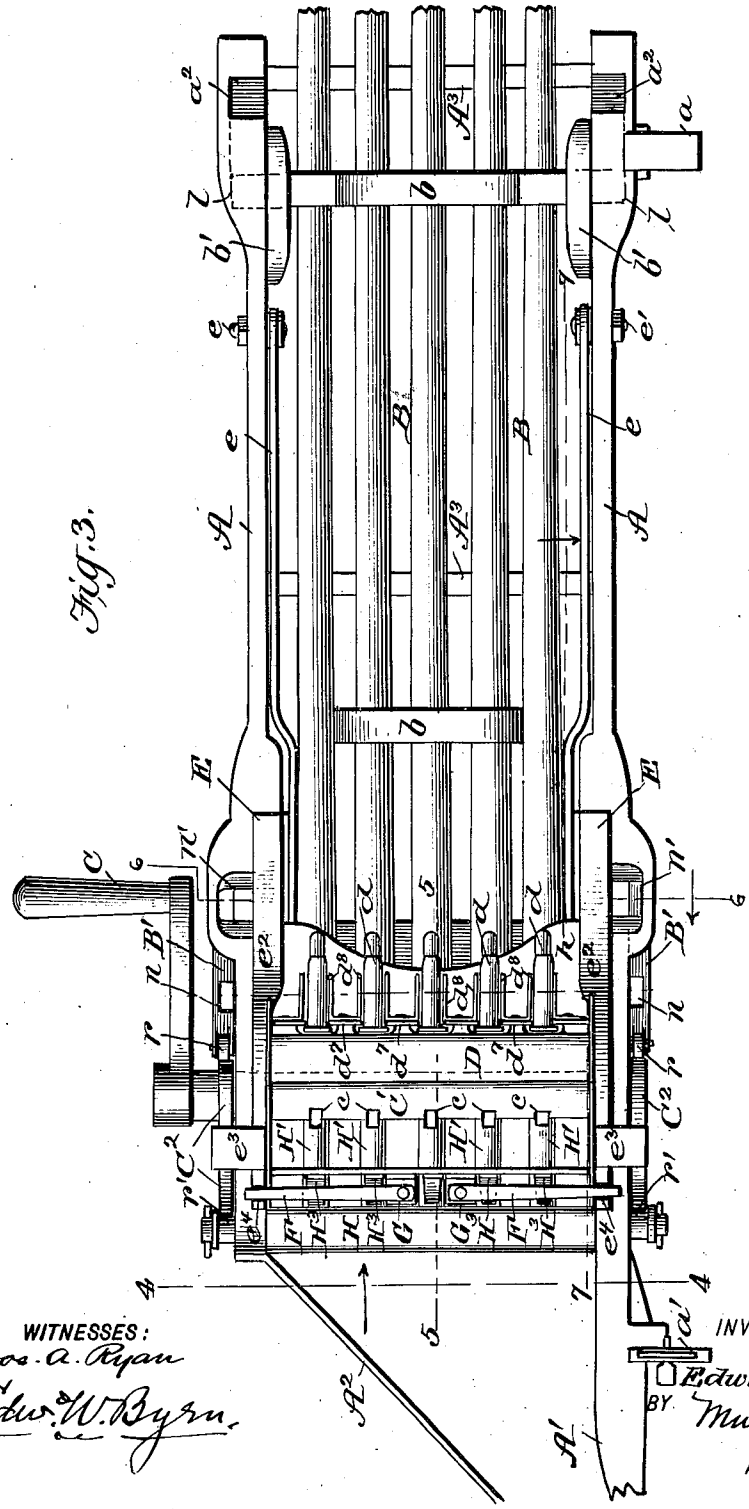
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Fig. 3.



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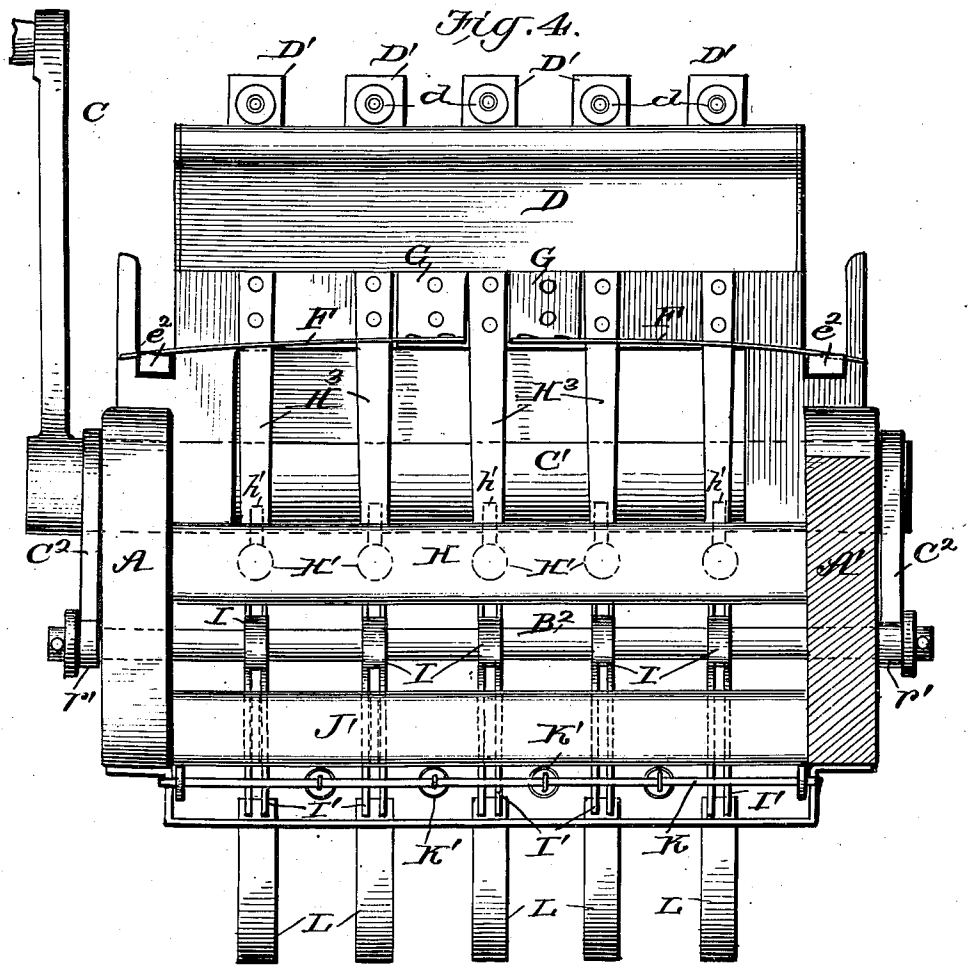
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Fig. 4.



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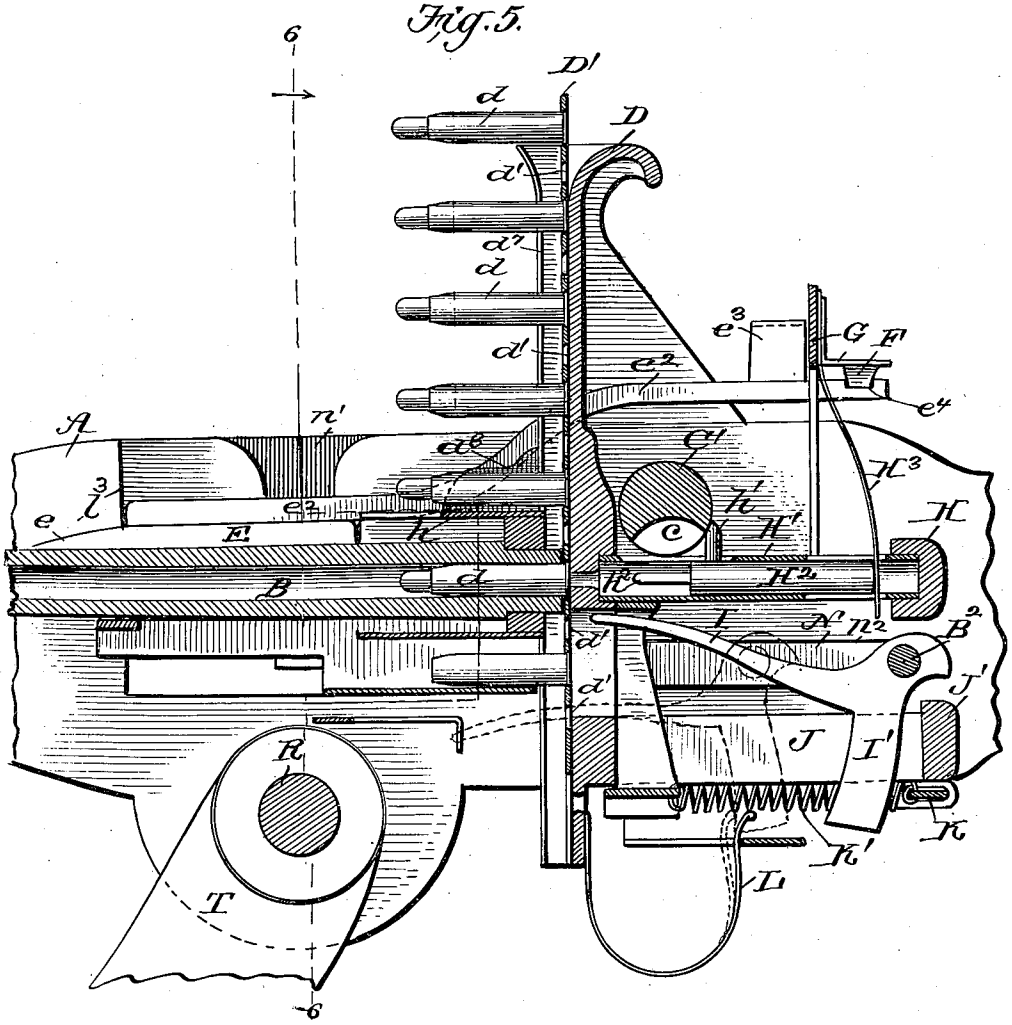
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Fig. 5.



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Fig. 6.

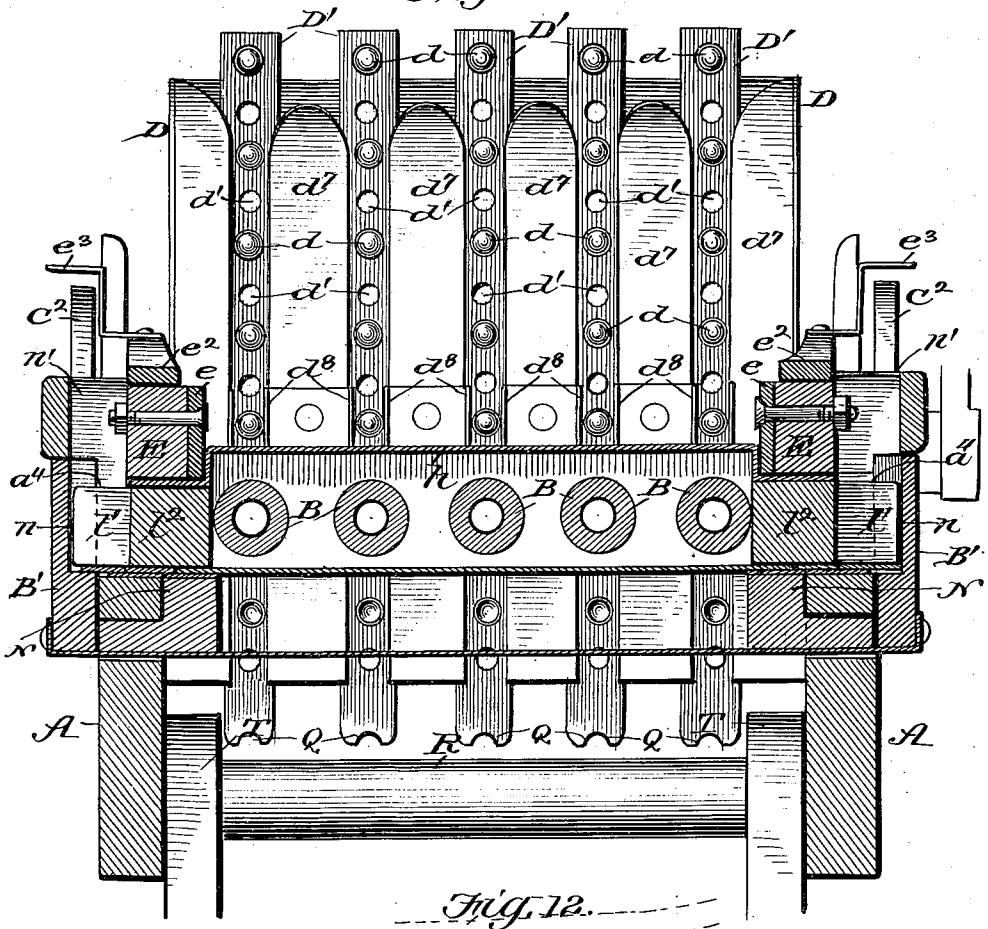
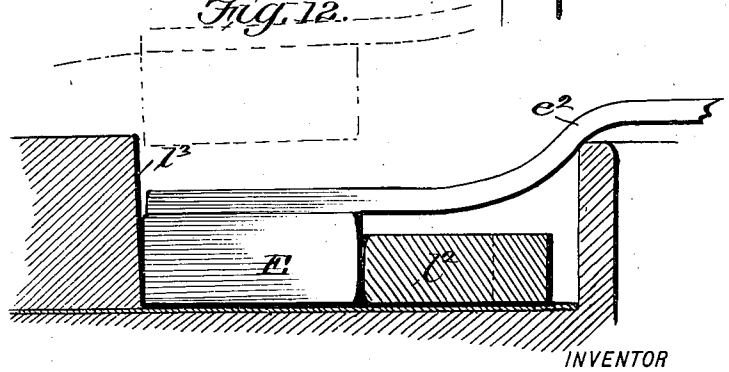


Fig. 12.



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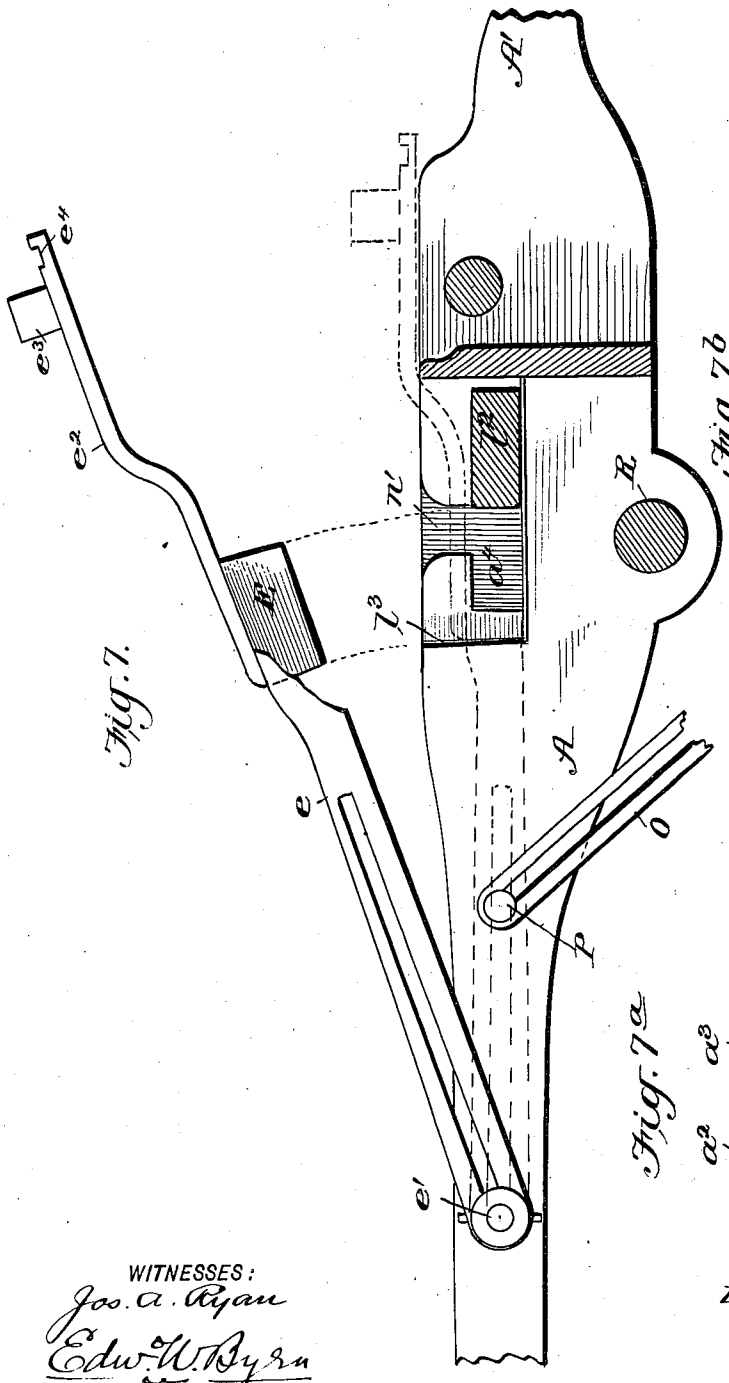


Fig. 7.

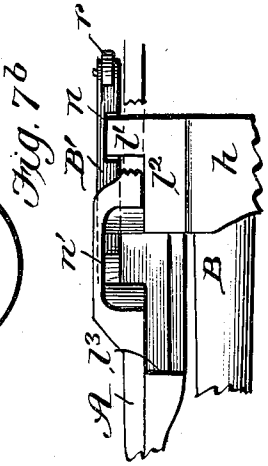


Fig. 7b

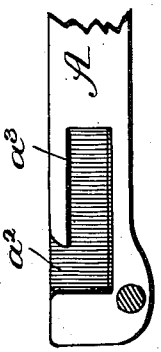


Fig. 7a

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Fig. 8.

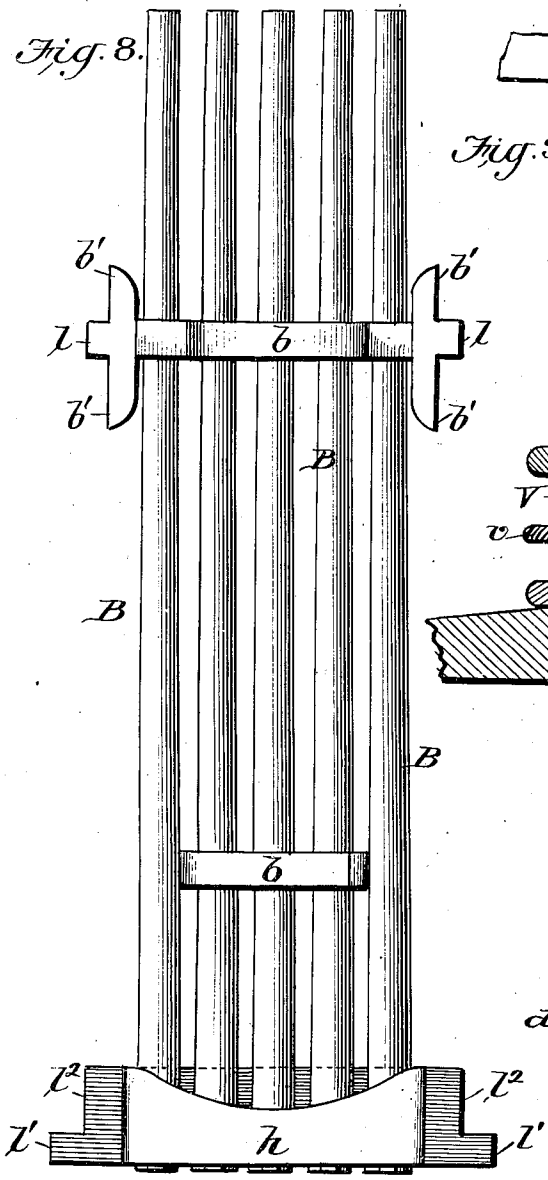


Fig. 9.

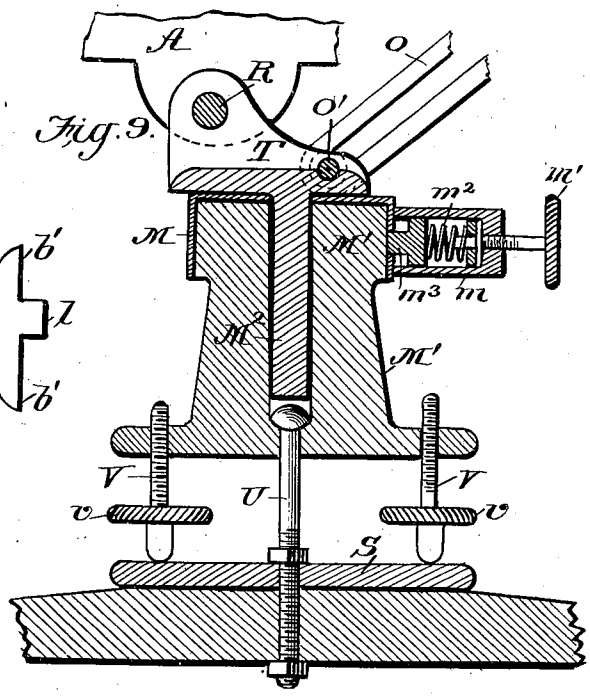
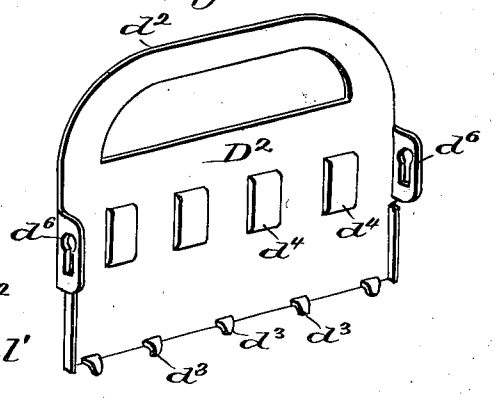


Fig. 11.



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UNITED STATES PATENT OFFICE.

EDWIN MORRIS CAPPS, OF SAN DIEGO, CALIFORNIA.

MACHINE-GUN.

SPECIFICATION forming part of Letters Patent No. 709,301, dated September 16, 1902.

Application filed November 1, 1901. Serial No. 80,807. (No model.)

To all whom it may concern:

Be it known that I, EDWIN MORRIS CAPPS, a citizen of the United States, and a resident of San Diego, in the county of San Diego and State of California, have made certain new and useful Improvements in Machine-Guns, of which the following is a specification.

My invention relates to machine-guns of that class in which a flat series of barrels disposed side by side in a suitable frame are arranged to be reciprocated longitudinally, so as to cause their open breech ends to alternately telescope over a corresponding series of cartridges while the latter are being fired and then advance sufficiently to allow the empty shells to drop, the mechanism for feeding the cartridge, exploding the same, and reciprocating the battery of the gun-barrels being all operated by a crank under the control of the gunner. As a representative gun of this type I may refer to that shown in my previous patent, No. 632,098, August 29, 1899, upon which my present invention is an improvement. The principal features of such improvement are as follows: first, the making of the group of barrels removable and interchangeable, so that when one set becomes heated or fouled it may be quickly removed and another set put in its place. It also consists in a special arrangement of chock-blocks for locking the barrels against recoil, which chock-blocks are specially related to the feature of the interchangeable barrels, so as to give room for their removal and replacement. It also further comprehends means for feeding cartridges to the gun in separate strips or holders, so as to individualize their action as far as possible and prevent cramping from expansion or other cause. It also further comprehends various improvements in the firing mechanisms, the cartridge-feeding devices, the angle-adjusting devices for the gun, and a special carrier for serving the gun, as will be hereinafter more fully described with reference to the drawings, in which—

Figure 1 is a perspective view of my gun in use. Fig. 2 is a side view of the principal parts of the gun. Fig. 3 is a plan view of the same. Fig. 4 is a sectional end elevation on line 4 4 of Fig. 3 looking in the direction of the arrow on said line. Fig. 5 is a vertical longitudinal section on line 5 5 of Fig. 3. Fig. 6 is a vertical transverse section on line 6 6 of Figs. 3 and 5 looking in the direction of the arrow on said line. Fig. 7 is a vertical longitudinal section on line 7 7 of Fig. 3 looking in the direction of the arrow on said line. Fig. 7^a is a detail of the slot in the inside face of the forward end of the frame. Fig. 7^b is a detail plan showing the connection of the barrel-lug with its actuating slide-plate. Fig. 8 is a plan view of the group of barrels detached from the gun. Figure 9 is a vertical central section through the gun-support, showing adjusting mechanism for the same. Fig. 10 is a face view of the ammunition-carrier filled with the cartridge-holder strips. Fig. 11 is a detail in perspective of the cartridge-carrier plate. Fig. 12 is a detail of the chock-block, and Fig. 13 a detail of the adjusting mechanism.

In the drawings, Figs. 1 and 3, A A A′ represent the main frame of my gun, of which A A are the two side pieces, which are arranged parallel to each other and between which are disposed the battery or barrels B. One of the side pieces is provided with a pointing-arm A′, which has a cushioned shoulder-piece at its end. On the forward end of one of the side pieces and also on the pointing-arm are arranged sights a a'. D, Figs. 1, 2, 3, is a transverse trough having vertical feed-throats for the ammunition, and C, Figs. 2, 3, 4, is a crank attached to a transverse shaft C′, Figs. 1, 4, 5, arranged in bearings in the side pieces A A and carrying on its ends outside the side pieces cams C^2 C^2, Figs. 1, 2, 3, which are arranged to act upon sliding plates B′ B′, Fig. 2, which are coupled to the barrels B, so that when the crank-handle is turned the barrels are alternately slid back and forth, moving backward to telescope over the horizontally-projecting cartridges and remaining there until they are fired and then sliding forward to allow space to the cartridge-shells to feed down and permit fresh cartridges to come into alinement with the bores of the barrels. This general principle of action is substantially the same as that shown and described in my aforementioned patent. In my said patent, however, the barrels are not removable, and when from rapid and continuous firing they become highly heated some obstruction of their nicety

action is liable to occur from expansion or m fouling, and it is desirable to quickly nove the battery of barrels in a group and lace them by fresh ones which are cool d clean. For this purpose I attach to the ss-pieces which connect the barrels the p-shaped handles *b b*, Figs. 1, 3, and 8, and novably connect this group of barrels to side pieces A A of the main frame, so that d group of barrels may be lifted vertically t of the frame by the handles to permit a w group of barrels to be quickly put in ir places with only a very little delay and thout materially stopping the action of the n for continued firing efficiency.

The two side pieces of the main frame are idly secured together by the cross-bars A^3 , Fig. 3, and also by the inclined brace A^2, tending toward the shoulder-rest. At the rward ends of the side pieces on their inner les are formed oppositely-facing grooves a^3 , Fig. 7^a, which at their forward ends have rtical outlets a^2, Figs. 3 and 7^a, at their up- r sides. These grooves receive lugs *l l*, gs. 3 and 8, on the ends of the front cross- ece which connects the barrels, and said ooves give these lugs room to play back id forth as the barrels reciprocate, the out- ts a^2 permitting the lugs to pass upwardly it of the grooves when the barrels are lifted om the gun. Between the lugs *l* and the ids of the cross-piece of the barrels long ide-bearings *b'* are provided to give a free id easy motion to the barrels, so as to slide ithout cramping and binding. To the breech ids of the barrels a cross-head *h*, Figs. 3 id 8, is firmly attached, and on its ends each side of the barrel are formed two igs l' l^2, Figs. 7, 7^b, and 8. Of these two lugs ie outer one, l', on each side slides in a hori- ontal slot a^4, Figs. 2, 6, 7, in the side pieces the frame, and they are received into otches *n*, Figs. 6 and 7^b, in the external ide-plates B', that are acted upon by the ams C^2, which slide-plates as they move back id forth cause the barrels to reciprocate. he other lugs l^2 at the ends of the cross-head f the barrels are longer than l' and form stout houlders against which chock-blocks bear in olding the gun-barrels against moving for- ard from the explosive strain, as hereinafter escribed. When the cams C^2 move the slide- lates B' B' and the barrels forward, said cams ct with a free rolling friction upon the steel ollers *r*, Figs. 2 and 3, on said slide-plates, nd when they move the slide-plates and bar- els back they bear with a rolling friction gainst steel rollers r' r' on rearwardly-ex- ending arms N N from the slide-plates. The ollers r' r' are carried on the ends of a shaft hich moves laterally back and forth in hori- ontal slots n^2 n^2, Figs. 1 and 2, in the side rames and coöperates with other parts of the un, as hereinafter described. The notches of the slide-plates B' when thrown to the orward position register with tapering out- ets n' n', Figs. 3, 7, and 7^b, in the side frames of the gun, and when in such position the lugs l' l' on the cross-head of the gun-barrels can pass into or out from their seats in the notches of the actuating slide-plates, thus allowing the barrels to be readily lifted out or placed in. When the barrels are thrown to their rear- ward position for firing, the shoulders or long lugs l^2 l^2 move backward from stationary shoulders l^3 l^3, Fig. 7, on the inner sides of the case a distance far enough to receive chock- blocks that hold the barrels against the ex- plosive strain. E E, Figs. 3, 7, 12, are these chock-blocks, of which there is one on each side, both constructed and arranged exactly alike. Each has attached to it a long slotted arm *e*, that is connected to a pivot-bolt *e'* on the inner face of the side frame A, so as to be capable of being turned back thereon and also to slide longitudinally thereon, so as to be out of the way. Projecting from the other side of each chock-block, Figs. 7, 4, 6, is another arm e^2, having a flanged lip e^3 and a notched seat e^4 at its end.

F F, Figs. 3 and 4, are two flat springs mounted transversely upon a cross-bar G, at- tached to the main frame just behind the cartridge-trough D. These springs F have their free ends resting upon the seats e^4 e^4 on the chock-block arms and tend to throw the chock-blocks down with a positive action, so as to cause the said chock-blocks to surely drop down into the spaces between the shoul- ders l^2 of the barrels and the stationary shoul- ders l^3 of the frame, as in Fig. 12, whenever the barrels are in their firing position. Some- what similar springs were employed in my pre- vious patent in front of the cartridge-trough; but to permit of the removal of the barrels such springs have been changed to a position in rear of the cartridge-trough, where they are out of the way of the upward movement of the barrels in removing the same. For the same reason I employ the two independent chock-blocks on the side instead of a single transverse chock-block, as shown in my pre- vious patent. After the gun has been fired and the barrels are to be thrown forward the cams C^2 C^2 on the side first act upon the lips e^3 e^3 of the chock-block arms (see Fig. 2) and lift the chock-blocks up from their positions behind the shoulders l^2 l^3 of the barrels, and then the cams, acting upon the slide plates B' B', force the barrels forward to permit a new feed of the cartridge.

I will now describe how the cartridges are fed to the gun, fired, and discharged. In the first place (see Figs. 10 and 11) the cartridges *d* are permanently swaged in long strips of metal D', which form holders, and between the pro- jecting cartridges there are formed alternat- ing holes *d'*, which are to receive feeding de- vices for positively feeding the cartridge- holders through the gun. Each of these holders is designed to serve one barrel of the gun, and all of said holders are simultaneously inserted into the gun by a single operation through the medium of a carrier. This con-

sists of a thin metal plate D^2, which has at one end a handle d^2 and at the other end a series of spurs d^3, corresponding to the number of cartridge-holders. These spurs are inserted into the holes d' of the holders D', and the holder-strips are kept spaced apart by lugs d^4 on the face of the plate D^2 and are retained upon the carrier by a long rod or key d^5, which extends through keyhole-slots in upturned flanges or ears d^6 d^6, formed on the side of the carrier. When the cartridge-holders are to be inserted into the gun, the group of holders is suspended bodily by the carrier above the trough D of the gun, with the holders immediately above the guide-channels formed between the vertical flanges d^7, Fig. 6, and then the key d^5 is withdrawn and the holders, with their cartridges, slide down into the respective channels, as seen in Figs. 5 and 6. The carrier-plates D^2 are stamped up cheaply, and after their charge of cartridge-holders is transferred to the gun the carrier-plates may be thrown away. In packing ammunition thus prepared two carriers, with their charges of cartridges and cartridge-holders, are placed together face to face, with the cartridges of one entering the spaces between the cartridges of the other and with the carrier-plates on the outside, thus protecting the ammunition. Alongside of the channels d^7 for the cartridge-holders there are attached to the stationary part of the trough projecting guide-blades d^8, Figs. 3, 5, 6. These are arranged in a horizontal row just above the plane of the cross-head of the gun-barrels and project horizontally toward and above the barrels and with the plane of their blades vertical. These blades guide the cartridges between them and hold them in true alinement to enter the bores of the barrels. After the barrels have been telescoped back upon the cartridges the latter are fired, as follows:

H, Figs. 4 and 5, is a cross-bar at the rear end of the side frames of the gun, to which cross-bar are rigidly attached forwardly-projecting tubes H' in exact alinement with the barrel-bores. In these tubes are located sliding plungers H^2, which have a central firing-pin h^2 and an upwardly-projecting trigger h'. The rear ends of the upper sides of the tubes H' are slotted, and down into these slots, in rear of the plungers H^2, there extends a corresponding series of springs H^3, attached to the fixed cross-bar G above. These springs tend to force the plungers and firing-pins forward to explode the cartridges whenever said plungers are forced back and suddenly released. To accomplish this, the crank-shaft C' has a series of transverse slots c immediately opposite the triggers h' of the firing-plungers. When the crank-shaft C' is turned, it bears against the triggers and forces them and their attached plungers and firing-pins back against the tension of the springs H^3, and as the shaft C' continues its motion and the slots c come opposite the triggers h' the latter then, having nothing to hold them back, fly forward from the tension of the springs and explode the cartridges. These slots c are so cut that they do not all act at once, but act in succession, so as to make the gun work more smoothly and with less recoil, as there is no cumulative or instantaneous strain either in recoil or in the rotation of the shaft. To feed the cartridge-holders down into the gun between the intervals of reciprocation of the barrels, a finger I (see Fig. 5) is made to advance from the rear and penetrate one of the holes d' in each of the cartridge-holders, pull down the cartridge-holders one space, then retire and rise to engage another hole. These motions are provided by the following mechanism: On the shaft B^2, which is attached to the arms N of sliding cam-plates B', there are loosely hung a series of the fingers I, (see Fig. 5,) having downwardly-projecting members I'. The members I' are guided upon stationary horizontal bars J. The lower ends of the members I' play between a cross-bar K on one side and springs L on the other. The cross-bar K is yielding and is pulled forward by springs K', anchored to a stationary part of the frame. Now as the shaft B^2 moves back the members I' strike the cross-bar K and said members are deflected thereby, throwing the finger I to the upper position, (shown in full lines,) where it is ready to enter one of the holes d' of the cartridge-holder. Then as the shaft B^2 moves forward the member I' strikes the spring L, and this pushes the member I' backward, and in moving the finger I down, as shown in dotted lines, drags the holder and its cartridges with it one space to bring a fresh cartridge of each holder into range of the barrels.

For training my gun I have provided three distinct adjustments. For a horizontal rotary sweep it is provided with an inverted-cup-shaped flange M, Figs. 1, 2, 9, having an attached box m on its side, and through this is tapped a set-screw m', which is made to engage with a pivotal base M' within the flange, and a stem M^2 from the center of the turn-table T enters a central hole in the base. The set-screw acts with an elastic tension against the pivoted head M', through the agency of a spring m^2 and a friction-shoe m^3. This permits the gun to be quickly swung horizontally and be fixed to any position. To raise or lower the muzzles of the gun, slotted arms O O, Figs. 1, 2, 9, 13, descend from a cross-bar P in the side frames, and a long screw-bolt O' passes through the turn-table and also through the slotted arms O, and a screw-nut O^2, Fig. 13, embraces the screw-threaded portion of the rod and bears against the side of one of the arms O and has a crank O^3 by which it may be quickly turned up tightly against the arms. The main frame A A of the gun is mounted on the turn-table T by a horizontal axis R, which permits the angle of the barrels to be changed to any elevation or depression, while the slotted arms

and crank-nut permit them to be fixed in this adjustment.

It sometimes happens that the ground is not level or that the enemy may be on a hillside, and then such a gun as mine, having a horizontal battery of barrels, would throw its projectiles in a horizontal plane that would not be parallel to the line of the enemy. I therefore provide means by which my gun may either be leveled or be canted so that one side will be low and the other high to meet these conditions. For this purpose the base M′ is anchored to a lower table S (see Fig. 9) by a king-bolt U, and the flange of the base M′ has tapped through it four set-screws V, with hand-wheels *v*, and the lower ends of which set-screws are simply stepped upon the table S. By turning the set-screws on one side of the center in one direction and those on the other side in the other the plane of the base is inclined in any desired direction, the set-screws all being maintained sufficiently tight to hold the king-bolt U under tension, and thus give this connection sufficient rigidity when set to the adjustment.

When one set of cartridge-holders are inserted into the gun and have by successive firings been fed through the gun, another set of holders follows down the first set, the holders being thus consecutively fed down, so as to permit continuous firing.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A machine-gun having a flat series of reciprocating barrels combined with a supporting-frame, the barrels and frame being detachably connected by lugs and seats having vertical outlets whereby the barrels are made removable by a vertical lifting action, substantially as described.

2. A machine-gun having a flat series of barrels with transverse connecting-bars, lugs, and one or more handholds, combined with a supporting-frame having seats with upwardly-opening outlets and made removable therefrom by a vertical lifting action, substantially as described.

3. A machine-gun comprising a flat series of barrels having laterally-projecting lugs, combined with a supporting-frame having along its inner sides oppositely-facing grooves having outlets on their upper sides to permit the lugs to be lifted out.

4. A machine-gun comprising a flat series of barrels, a frame with guides adapted to receive said barrels and two chock-blocks, one on each side of the barrels for locking the same against the explosive strain there being a free open space between the chock-blocks above the barrels to permit the upward removal of the same.

5. A machine-gun comprising a flat series of barrels, a frame with guides adapted to receive said barrels, two chock-blocks, one on each side of the barrels for holding the same against explosive strain and a spring for positively holding the chock-blocks down, said spring being located behind the cartridge-feeding devices.

6. In a machine-gun having a horizontal flat series of barrels, the combination with said barrels of an independent vertical feed-throat for each barrel located in the rear of the breech end of the barrel and adapted to receive a separate strip of cartridges for each barrel, the cartridges of each strip being connected together and separately fed down its own guide whereby free individual feed for each barrel is maintained without cramping and binding from expansion by heat.

7. In a machine-gun having a horizontal flat series of barrels, the combination with the barrels and means for reciprocating them longitudinally; of an independent vertical feed-throat for each barrel having overhanging edges adapted to receive a strip bearing cartridges, said feed-throats having between them above the level of the barrels horizontally-projecting blades d^8 lying against the cartridges and arranged in vertical planes to guide the cartridges to proper alinement to enter the barrels.

8. In a machine-gun having a horizontal flat series of barrels, the combination of a series of vertical feed-throats extending transversely to the barrels at the breech end; an independent holder-strip for each series of cartridges for each barrel permanently fixed to each cartridge and having holes alternating with the cartridges, separate feed devices adapted to enter said holes and a detachable carrier with means for locking each strip of cartridges in the carrier the same distance apart as the feed-throats and simultaneously inserting them all into the feed-throats.

9. In a machine-gun having a horizontal flat series of barrels, the combination of a series of vertical feed-throats extending transversely to the barrels at the breech end; an independent holder-strip for each series of cartridges for each barrel having holes alternating with the cartridges, separate feed devices adapted to enter said holes and a detachable carrier for holding the cartridge-strips in alinement with the feed-throats said carrier consisting of a flat plate with spurs at its lower end adapted to enter the holes in the cartridge-holders and said plate also having spacing devices, and a handle, and also right-angular flanges on its opposite edges with slots forming locking-seats, and a locking-rod passing over the cartridge-holders and through said locking-seats.

10. The combination with a machine-gun having a flat series of barrels; of a transverse feed-trough having on its front side a separate channel-guide for each barrel, cartridge-holders for each guide having rigidly-fixed cartridges therein with alternating feed-holes, and a positively-acting feed-finger for each cartridge-holder.

11. In a machine-gun, the combination with the feed mechanism; of a firing mechanism

comprising a rotary horizontal shaft having transverse slots *c* cut in the same, a series of horizontal firing-plungers H^2 arranged below said rotary shaft and having triggers *h'* projecting upwardly in rear of the said shaft and in line with the slots, a series of fixed tubular guides H' embracing the plungers and having slots at their rear ends, a stationary anchorage-bar H connected to the rear ends of said tubular guides, and a series of pendent springs H^3 fixedly supported at their upper ends and depending through the slots in the tubular guides and bearing against the plungers substantially as shown and described.

12. In a machine-gun, the combination with the cartridge-holders; of a reciprocating shaft having loosely-hung fingers thereon adapted to engage cartridge-holders, and having a projecting member arranged between two yielding surfaces which alternately lift the fingers and pull down the cartridge-holders as the shaft reciprocates.

13. In a machine-gun, the combination with cartridge-holders having a series of feed-openings along the same; of a reciprocating shaft B^2 having loosely-hung fingers I with downwardly-projecting members I', the guide J, the yielding bar K with springs K', and the springs L, the members I' being arranged to play between the bar K and springs L.

EDWIN MORRIS CAPPS.

Witnesses:
W. L. FREVERT,
CHAS. W. OESTING.