

1,055,759.

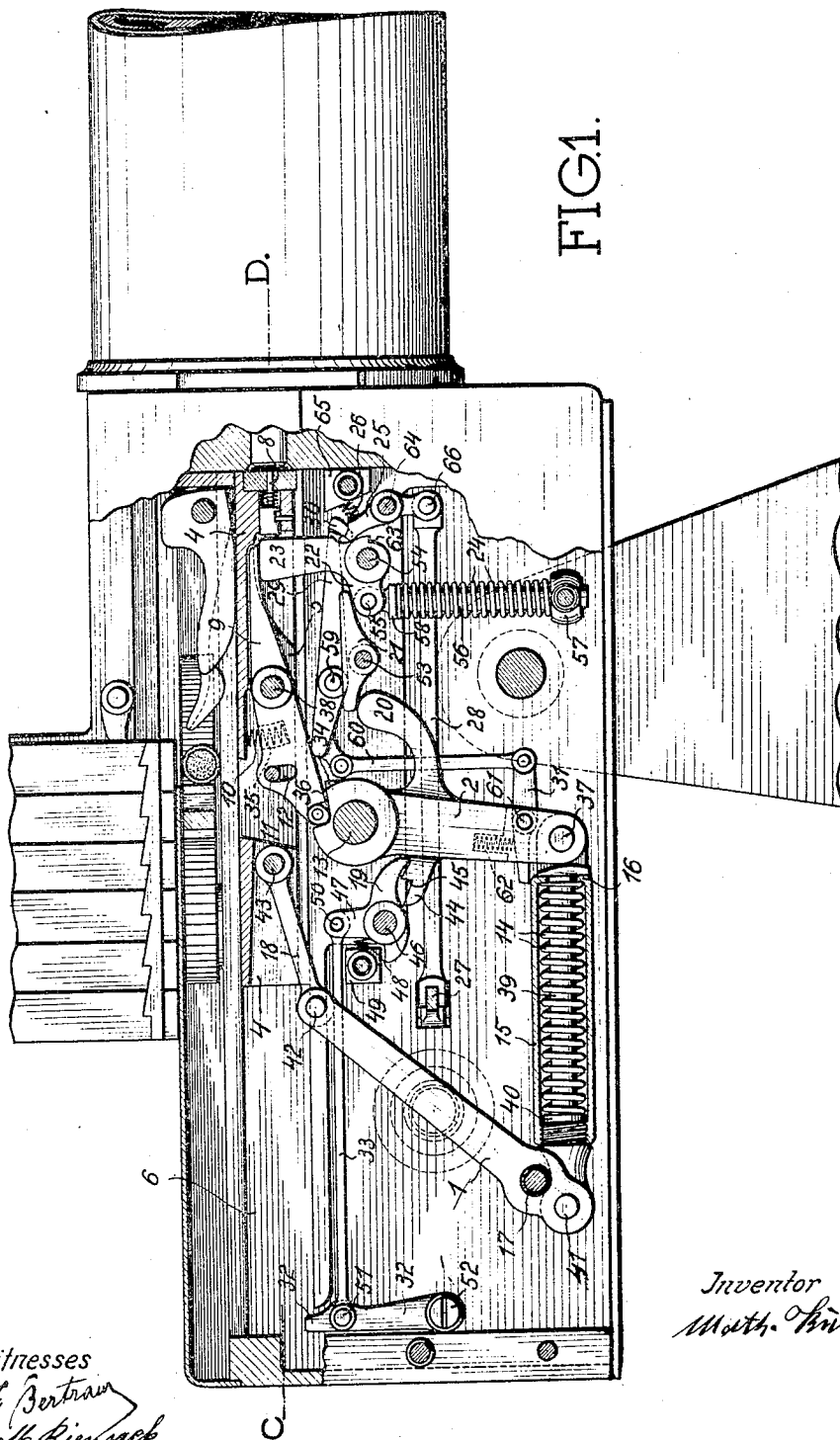


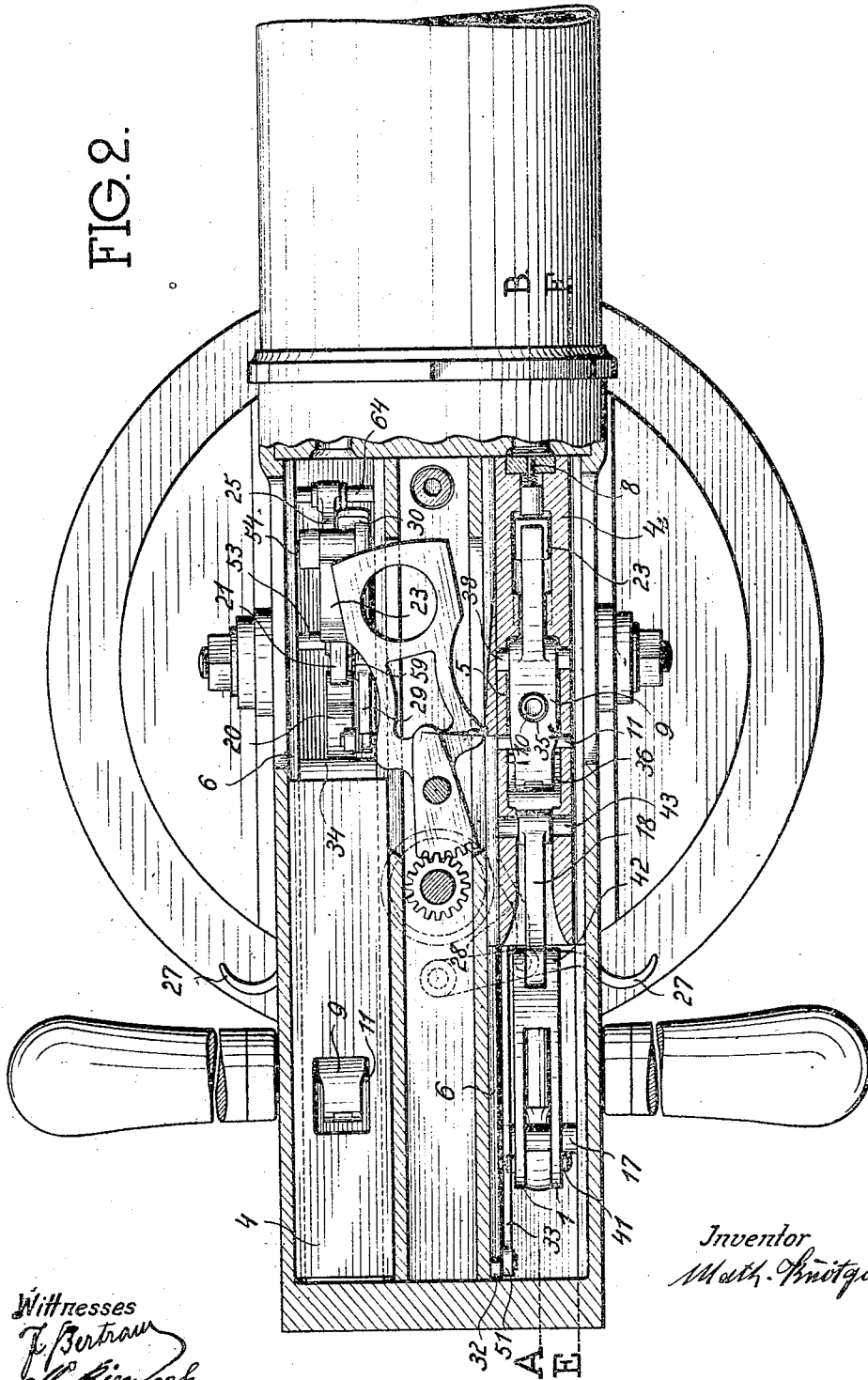
FIG. 1.

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FIG. 2.



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AUTOMATIC MACHINE GUN.
APPLICATION FILED DEC. 20, 1912.

Patented Mar. 11, 1913.

3 SHEETS—SHEET 3.

FIG. 3.

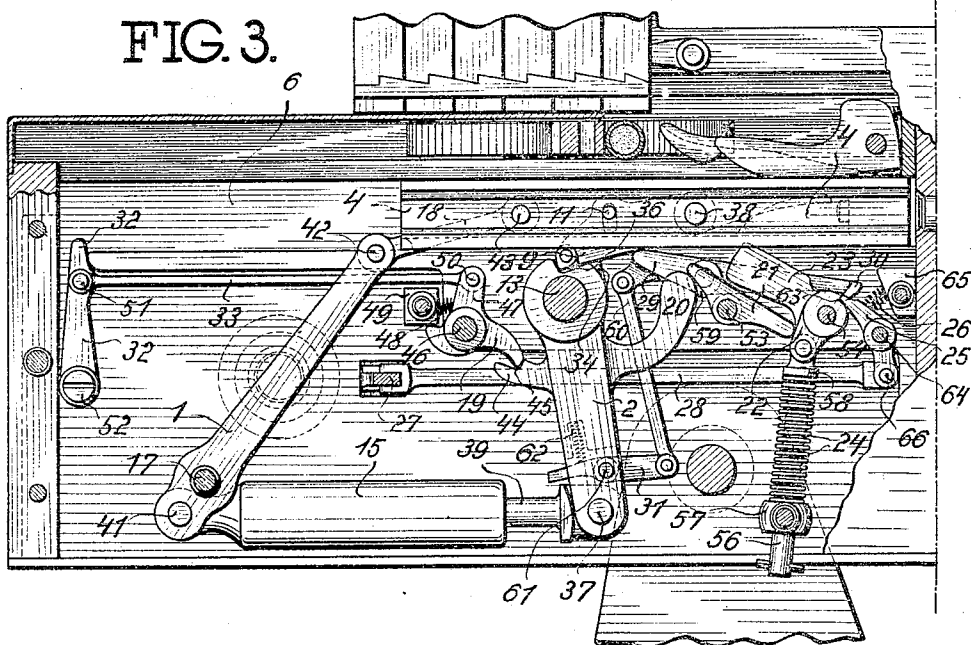
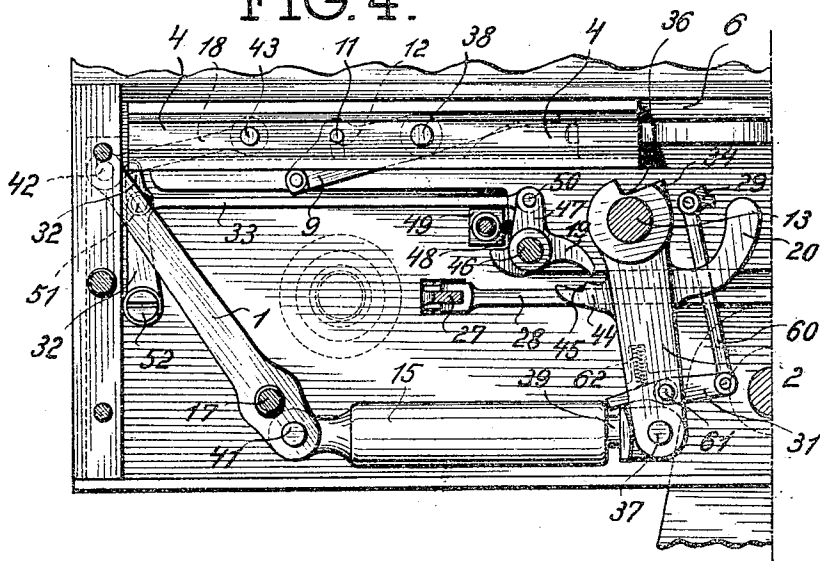


FIG. 4.



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MATHIAS KNÖTGEN, OF COLOGNE, GERMANY, ASSIGNOR TO GESELLSCHAFT ZUR VERWERTUNG VON FEUERWAFFEN-PATENTEN M. B. H., OF COLOGNE, GERMANY.

AUTOMATIC MACHINE-GUN.

1,055,759.

Specification of Letters Patent.

Patented Mar. 11, 1913.

Application filed December 20, 1912. Serial No. 737,840.

To all whom it may concern:

Be it known that I, MATHIAS KNÖTGEN, a subject of the German Emperor, and resident of Cologne-on-the-Rhine, Germany, have invented certain new and useful Improvements in Automatic Machine-Guns, of which the following is a specification.

This invention relates to improvements in machine-guns of the type described in the U. S. Patent 1,032,413, in which the breech blocks are moved to and fro for a removal of an empty cartridge and insertion of a fresh cartridge, the improvements consisting in the particular arrangement of levers and springs for effecting said movement. The accompanying drawing shows the improved arrangement.

Figure 1 is a sectional side view of the same, on the line A—B of Fig. 2, which is a horizontal section on the line C—D of Fig. 1. Fig. 3 is a vertical longitudinal section, on the line E—F, Fig. 2, through one breech chamber after firing, and Fig. 4 is a section similar to Fig. 3, showing the breech block in its rearmost position.

The breech blocks 4, while sliding in guides 6 of the breech chamber walls, are alternately moved forward and backward, as described in the above-mentioned U. S. patent. At the front, the breech blocks carry the igniting pins 8 and behind the latter recesses 5 are formed in their undersides, in which the pawl-levers 9 are arranged. The latter turn on bolts 38 and carry borings 35, in which spiral springs 10 are located, which at the top bear against the breech blocks and press the pawl-levers downward. Pins 11, which project through slots 12 in these levers, prevent the latter from being depressed too far. Said levers are hereinafter designated as breech block pawls. They engage with notches 36 on the double-armed levers 2, which turn on bolts 13. With the long arms of said levers, rods 39 are pivotally connected at 37, which on their free ends carry collars 40. Said rods are encircled by spiral springs 14, around which shells 15 are placed, which at one end are pivotally connected at 41 with the short arms of double-armed levers 1. The other ends of the shells carry inwardly bent edges 16, against which bear the spiral springs 14. The levers 1 turn on bolts 17 and are with their long arms pivotally connected at 42 to

links 18, the other ends of which are fulcrumed at 43 to the breech blocks 4.

It is obvious that upon a small backward movement of the breech block the breech block pawl 9 turns the lever 2 so far that its long arm moves a comparatively great distance. Meanwhile, the short arm of lever 1 is turned a little only. Consequently, pivot 37 is turned further to the right than pivot 41, so that spring 14 is tensioned.

Lever 2 carries on its long arm two projections 44 and 20, of which the latter is bent upward and the former carries a notch 45. On the breech casing a pawl 19 is fulcrumed at 46, said pawl being provided with an arm 47, against which bears a spiral spring 48, which with its other end bears against a projection 49 on the wall of the breech casing. The arm 47 is pivotally connected at 50 with a rod 33, which at its other end is pivoted at 51 to a lever 32. The latter is fulcrumed on a bolt 52 and projects with its upper end into the path of the breech block.

A double-armed lever 21, which turns on a bolt 53, bears with one arm against one arm 22 of an angle-lever 22, 23 which is fulcrumed on bolt 54. The other arm of said angle-lever is rather strong and serves as a hammer for striking the igniting pin 8 and driving the same forward. The arm 22 is at 55 pivotally connected with a rod 56, which projects through a movable lug 57 arranged on the breech casing. Said rod is encircled by a spiral spring 24, which intervenes between said lug 57 and a collar 58 of rod 56. Upon depression of the arm 22 by the lever 21, the spiral spring 24 is tensioned.

Below the breech block pawl 9, a double-armed lever 29 is fulcrumed on bolt 59 of the breech casing. One arm of said lever is pivotally connected by a link 60 with a double-armed lever 31, which at 61 is pivotally mounted on the lever 2. The free end of said lever 31 is by action of a spring 62 pressed toward the shell 15. The other arm of the lever 29 carries on its end a hook 30 which bears against the boss of angle-lever 22, 23. Said boss carries a notch 63 adapted to engage with the hook 30 upon the angle-lever being turned. On the breech casing, further, a double-armed lever 25 is movably located by a bolt 64, one arm of said lever

bearing also against the boss of angle-lever 22, 23 beside the hook 30 and engaging the notch 63 upon the angle-lever being turned.

A spring 26 intervenes between this lever arm and a projection 65 of the breech casing. The other arm of lever 25 is at 66 pivotally connected with a rod 28, which with its other end is attached to the trigger 27 of the machine-gun. Upon the latter being pulled back, the lever 25 is turned and raised from the notch 63.

The operation of the gun is as follows:—

Upon a cartridge being fired, the pressure of the powder gases drives the breech block 4 back. Thereby, by means of the breech block pawl 9 the lever 2 and by means of link 18 the lever 1 is turned, the spring 14 being, as already mentioned, thus tensioned by a short backward movement of the breech block 4. The largest part of the recoil is thus compensated by spring 14. After short backward movement of the breech block, the projection 34 of lever 2 presses the breech block pawl out of the notch 36, so that now the breech block can move farther backward. A short time before this, the pawl 19 has fallen into the notch 45 of lever 2, so that the latter is prevented from turning backward. Thus, upon the breech block moving farther backward, the spring 14 is again untensioned. By the movement of lever 2, also lever 21 is turned by the projection 20. The hammer 23 is moved downward, so that the breech block pawl can be raised from the notch 36. Thereby, spring 24 is tensioned until hook 30 and lever 25 engage the notch 63 thus fixing the angle-lever 22, 23, as shown in Fig. 3. Upon engagement of the hook 30 with notch 63, also the lever 31 is turned and its free end is lowered, for the lever 2, on which it is mounted, is moved away from the shell 15 as shown in Fig. 3. Upon the breech block reaching the end of its backward movement, Fig. 4, the levers 21, 29 and 25 assume the position shown in Fig. 3. In its rearmost position, the breech block abuts against the upper extension of lever 32, so that the latter disengages through the rod 33 the pawl 19, as shown in Fig. 4. Thereby, lever 2 is liberated and allowed to turn back, while the spring 14 is untensioned. Then, however, the lever 31 abuts against the shell 15, so that spring 14 remains still somewhat tensioned. As described in the above mentioned U. S. patent, by the backward movement of one breech block the other breech block is moved forward. Upon the latter being now driven back in the above described way by firing a cartridge, the other breech block is again moved forward until it abuts against the mouth of the barrel. Thereupon, the breech block pawl engages again the notch 36 and thus locks the breech block. Said engage-

ment can easily take place, since lever 2 has not yet returned into its position of rest, for the lever 31 bears still against the front end of shell 15. Upon the engagement of the breech block pawl with the notch 36, however, the lever 29 is depressed and thus lever 31 liberated from the shell 15, so that lever 2 is allowed to return into its end position (Fig. 1), whereby owing to the still existing tension of spring 14 the breech block is firmly pressed toward the barrel. Upon descent of the breech block pawl 9, also hook 30 of lever 29 is disengaged, so that now a pressure on the trigger 27 has the effect to raise also lever 25 from the notch 63 and to liberate the hammer 23. The latter is by the spring 24 projected against the igniting pin 8, so that the cartridge is fired. Upon the ascent of the hammer 23, its upper surface presses against the free end of breech block pawl 9 and effects thus a firm engagement of the latter with lever 2. At the moment of firing a cartridge, thus a reliable closing of the breech is secured. Upon the trigger 27 being continuously kept back, whereby lever 25 is prevented from engaging notch 63, firing is effected automatically, as the hook 30 arresting the hammer 23 is disengaged by the breech block pawl.

I claim:

1. In an automatic machine-gun, the combination of a breech block adapted to move backward and forward, two double-armed levers having each a short arm and a long arm, a spring between the short arm of one lever and the long arm of the other lever, means to allow the long arm of one lever to participate in the whole backward movement of the breech block, and a breech block pawl to engage the short arm of the other lever and to move it during a small part of said movement only, substantially as and for the purpose set forth.

2. In an automatic machine-gun, the combination of a breech block adapted to move backward and forward, two double-armed levers having each a short arm and a long arm, a spring between the short arm of one lever and the long arm of the other lever, means to allow the long arm of one lever to participate in the whole backward movement of the breech block, a breech block pawl to engage the short arm of the other lever and to move it during a small part of said movement only, and an arresting device to fix the latter lever upon the same being liberated from the breech block pawl and adapted to be disengaged by said breech block at the end of its backward movement, substantially as and for the purpose set forth.

3. In an automatic machine-gun, the combination of a breech block adapted to move backward and forward, two double-armed levers having each a short arm and a long

arm, a spring between the short arm of one lever and the long arm of the other lever, means to allow the long arm of one lever to participate in the whole backward movement of the breech block, a breech block pawl to engage the short arm of the other lever and to move it during a small part of said movement only, and a firing hammer adapted to be tensioned by the turning movement of the latter lever, substantially as and for the purpose set forth.

4. In an automatic machine-gun, the combination of a breech block adapted to move backward and forward, two double-armed levers having each a short arm and a long arm, a spring between the short arm of one lever and the long arm of the other lever, means to allow the long arm of one lever to participate in the whole backward movement of the breech block, a breech block pawl to engage the short arm of the other lever and to move it during a small part of said movement only, a firing hammer adapted to be tensioned by the turning movement of the latter lever, a trigger and a separate arresting device to keep the hammer in tensioned position, said device adapted to be automatically put in or out of operation respectively by the disengagement and engagement of the breech block pawl with the corresponding lever, substantially as and for the purpose set forth.

5. In an automatic machine-gun, the combination of a breech block adapted to move forward and backward, two double-armed levers having each a short arm and a long arm, a spring between the short arm of one lever and the long arm of the other lever,

means to allow the long arm of one lever to participate in the whole backward movement of the breech block, a breech block pawl to engage the short arm of the other lever and to move it during a small part of said movement only, and a lever to arrest the spring shortly before the same becoming untensioned and adapted to be disengaged by the engagement of breech block pawl and corresponding lever, the spring being then adapted to fix the breech block in its closed position, substantially as and for the purpose set forth.

6. In an automatic machine-gun, the combination of a breech block adapted to move backward and forward, two double-armed levers having each a short arm and a long arm, a spring between the short arm of one lever and the long arm of the other lever, means to allow the long arm of one lever to participate in the whole backward movement of said breech block, a breech block pawl to engage the short arm of the other lever and to move it during a small part of said movement only, a firing hammer adapted to be tensioned by the turning movement of the latter lever, and an extension on said breech block pawl adapted to be pressed upward by said hammer upon the same being operated, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

MATHIAS KNÖTGEN.

Witnesses:

LOUIS VANDORY,
BESSIE F. DUNLAP