



PATENT SPECIFICATION

603,750

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PROVISIONAL SPECIFICATION

Improvements in Machine Gun Locks

We, VICKERS-ARMSTRONGS LIMITED, a British Company, of Vickers House, Broadway, Westminster, London, S.W.1, and PERCY REUBEN HIGSON, a subject of the King of Great Britain, of the aforesaid Company's address, do hereby declare the nature of this invention to be as follows:—

This invention relates to machine guns, generally known as the "Vickers" type, and the object of the present invention is to simplify considerably the locking and firing mechanism so as to dispense with the cocking of the firing pin and also to obviate the necessity of the present main spring, tumbler, handsear, safety sear, left and right hand lifting levers and the customary moving extractor.

According to this invention there is combined with means for translating the cartridges successively from the feed box to the barrel, a side lever pivoted to the housing for the firing pin and extractor, the firing pin and the said lever having co-operating opposed parts adapted to be abutted together by movement of the lever relatively to the said housing, the arrangement being that the forward movement and the firing of the cartridges is controlled by the contact between the side lever and the firing pin when bringing the firing mechanism to the locked position.

In carrying the invention into practice, the housing for the firing pin is formed at its rear end with a pendant abutment adapted to trip over a spring-loaded sear which normally prevents forward translative movement of the housing and cartridge, the cartridge being maintained in alignment with the barrel by a spring-loaded detent accommodated in the front end of the housing immediately subjacent the tapered bore receiving the operative end of the firing pin, the firing pin body reciprocating in the cylindrical bore of the housing. In this connection the firing pin has only a very small displacement relatively to the housing, e.g. not more than one eighth of an inch, the forward movement of the firing pin relatively to the housing being against the influence of a coiled compression spring interposed

between a step protruding inwardly at the front end of the bore of the housing and a step formed in the front end of the body part of the firing pin. The reason for this very small relative displacement of the firing pin and the housing is because, that by means of the present invention, the customary cocking of the firing pin is dispensed with, the forward movement and the firing of the cartridge being controlled by the contact between the aforesaid side lever and the firing pin at the time the mechanism closes to the locked position. This contact is obtained by the provision on the rear part of the firing pin of an abutment surface located at a suitable angle, e.g. 45° to the axis of the firing pin, and a corresponding surface formed on the side lever approximately midway between its ends, the front end of the side lever being pivoted to a pin passed transversely through the front part of the housing, the firing pin being slotted longitudinally to accommodate such firing pin and to afford the requisite clearance for the reciprocation of the firing pin within the housing.

To fire, the sear is depressed, and until it is released, the housing carrying the cartridge with it moves forward until the cartridge case is fully home in the breech and the firing pin makes effective driving contact with the base of the cartridge.

The cartridges are transported from the feed box, which is disposed immediately above the breech, to the barrel by a carrier reciprocating vertically in a slide formed in an upstanding guide at the front end of the housing, this carrier ultimately bringing the appropriate cartridge into engagement with the aforesaid spring loaded detent in order that the cartridge may be located at the front end of the housing and supported in co-axial alignment with the barrel. The reciprocating movement of the carrier vertically relatively to the axis of travel of the housing is controlled by spaced and opposed inclined cam surfaces, and ramps on a side plate and top cover respectively.

Assembled to the said carrier is a spring loaded ejector pivoted to a slide or bracket slidably supported by the carrier for slight vertical reciprocation relatively to the carrier,

this ejector operating to eject the case of the last cartridge from the extractor. This ejector is deflected by the cartridge in the feed box, and is thereby caused to be inoperative until there is no cartridge in the belt, when the ejector is urged slightly forwards, by its spring and is carried down with the carrier to its lowermost position to eject the cartridge case of the last fired cartridge over and beyond the aforesaid spring loaded detent. For this latter operation the front edge of the slide is formed with a recess dimensioned to receive readily the ejector, the ejector comprising a finger pivoted to the slide and spring loaded forwardly as aforesaid by a coiled compression spring, the arrangement being such that the lower part of this ejector is prevented from moving forwardly under the influence of such spring by reason of its

engagement with the base of the appropriate cartridge in the feed box, but following the removal of the last round in the feed box the ejector is free to move forwardly on its pivot so that its lower end bears against the uppermost point of the base of the cartridge case and pushes such case downwardly beyond the spring loaded detent.

Dated this 29th day of October, 1945.

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COMPLETE SPECIFICATION

Improvements in Machine Gun Locks

We, VICKERS-ARMSTRONGS LIMITED, a British Company, of Vickers House, Broadway, Westminster, London, S.W.1, and PERCY REUBEN HIGSON, of British nationality, of the aforesaid Company's address, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

This invention relates to machine guns, generally known as the "Vickers" type in which the firing pin is operated during the locking action of a side lever actuating a reciprocating breech block. The side lever may be actuated in the manner described in British Patent Specification No. 414,658. The object of the present invention is to simplify considerably the locking and firing mechanism so as to dispense with the cocking of the firing pin.

According to this invention a machine gun of the "Vickers" type in which the firing pin is operated during the locking action of a side lever actuating a reciprocating breech block is characterised in that the firing pin is displaceable to the firing position in and relatively to the breech block, and that the side lever drives the firing forwardly relatively to the breech block to fire the gun upon closing the breech.

In carrying one form of the invention into practice there is combined with means for translating the cartridges successively from the feed box to the barrel, a side lever pivoted to the breech block accommodating the firing pin and extractor, the firing pin and the said lever having co-operating opposed parts adapted to be abutted together when the lever is moved into the locked position, the

arrangement being that the forward movement and the firing of the cartridges is controlled by the contact between the side lever and the firing pin when bringing the firing mechanism to the locked position.

In order that the invention may be clearly understood and readily carried into effect, drawings are appended hereto illustrating an embodiment thereof, and wherein,

Figure 1 is a broken sectional side elevation of a Vickers machine gun breech mechanism in the firing position and embodying the present invention.

Figure 2 is a sectional side elevation showing the breech mechanism with the breech block a full recoil and with a round positioned ready for ramming into the breech,

Figure 3 is a sectional elevation of the breech in the firing position and firing the last round, and

Figure 4 is a sectional elevation showing the cartridge case of the last round being ejected.

Referring to the drawings, the breech block is in the form of a housing 1 for the firing pin 5 and is formed at its rear end with a pendant abutment 2 adapted to trip over a spring loaded sear 3 which normally prevents forward translative movement of the housing 1 and the cartridge C² which is held by its rim in known manner between the flanges 17a of a guide 17 upstanding from the front end of the housing 1, the round being held in alignment with the barrel B when the housing is held back by the sear 3 (as shown in Figure 2) by the downward pressure of the lower front corner part 15a of a carrier 15 reciprocating in the guide 17, the cartridge being abutted against a stop in the form of a spring loaded detent 4 accommodated in the front end of the

housing immediately subjacent the tapered bore 5a receiving the operative end of the firing pin 5, the firing pin body reciprocating in the cylindrical bore 6 of the housing. In this connection the firing pin has only a very small displacement relatively to the housing e.g. not more than one eighth of an inch, the forward movement of the firing pin relatively to the housing being against the influence of a coiled compression spring 7 interposed between a step 9 protruding inwardly at the front end of the bore of the housing and a step 8 formed in the front end of the body part of the firing pin. The reason for this very small relative displacement of the firing pin and the housing is because, that by means of the present invention, the customary cocking of the firing pin is dispensed with, the forward movement and the firing of the cartridge being controlled by the contact between a side lever 10 and the firing pin at the time the mechanism closes to the locked position. That is to say the round is fired by actual positive displacement of the firing pin forwardly against the influence of the spring 7 as the lever 10 completes its forward or loading action. This positive displacement, or forward pushing of the firing pin relatively to the housing 1 is obtained by the provision on the rear part of the firing pin of a cam or inclined abutment surface 11 located at a suitable angle, e.g. 45° to the axis of the firing pin, and a corresponding surface 12 formed on the side lever approximately midway between its ends, the front end of the side lever being part of a known toggle action device and being pivoted to a pin 13 passed transversely through the front part of the housing 1, the firing pin being slotted longitudinally as at 14 to accommodate such firing pin and to afford the requisite clearance for the reciprocation of the firing pin within the housing. The firing pin is forced forward to fire the cartridge by the face 12 on the side lever striking the face 11 on the firing pin at the instant the toggle action on the side lever 10 closes and the mechanism is locked.

To fire, the sear is depressed, and until it is released, the housing 1 carrying the cartridge C¹ with it moves forward until the cartridge case is fully home in the breech and the firing pin makes effective driving contact with the base of the cartridge contemporaneously with the movement of the side lever 10 into axial or parallel alignment with the barrel 13 as shown in Figure 1. By this means cocking mechanism for the firing pin is obviated.

The cartridges are transported from the feed box 18, which is disposed immediately above the breech, to the barrel by the guide 17 which receives the rim of the appropriate round as aforesaid, and the round is urged along the flanges 17a simultaneously by the downward movement of the carrier 15 in channels 16 in the guide 17, thus ultimately

bringing the appropriate cartridge into engagement with the aforesaid spring loaded detent 4 (see Figure 2) in order that the cartridge may be located correctly at the front end of the housing and supported in co-axial alignment with the barrel. The reciprocating movement of the carrier vertically relatively to the axis of travel of the housing is controlled by an island type cam, i.e. spaced and opposed inclined cam surfaces 19, 19', 20 and 20' on a side plate 21 and top cover 22 respectively. That is to say the downward movement of the carrier 15 is effected during the rearward travel of the horns 15' along the rear or descending part 19' of the upper cam surface, and also during the forward movement of the horns 15' along the forwardly descending part 20' of the lower cam surface, the return or upward movement being derived from the cam or ramp surfaces 20.

When a round has been fired its case is withdrawn as the breech block is retracted, by reason of the interengagement of the cartridge case rim and the flanges 17a and in due course is ejected by the succeeding round forcing the empty cartridge case downwards over the detent 4.

Assembled to the said carrier 15 is a spring loaded ejector 23 pivoted on a pin 24 to a slide 25 slidably supported by the carrier for slight vertical reciprocation relatively to the carrier 15, this ejector operating to eject the case of the last cartridge from the lower end of the flanges 17a, these flanges in effect forming a T-section slot in the guide 17 to receive the cartridge case rims. This ejector is deflected as shown in Figure 1 by the cartridge C¹ in the feed box, and is thereby caused to be inoperative until there is no cartridge in the belt, when as shown in Figure 3, the ejector is urged slightly forward by its spring 26 and with the slide 25 is carried down with the carrier to its lowermost position as shown in Figure 4 to eject the cartridge case C² of the last fired cartridge over and beyond the aforesaid spring loaded detent 4. For this latter operation the front edge of the slide is formed with a recess 27 dimensioned to receive readily the ejector 23, the ejector comprising a finger pivoted to the slide and spring loaded forwardly as aforesaid by the coiled compression spring 26, the arrangement being such that the lower part of this ejector is prevented from moving forwardly under the influence of such spring by reason of its engagement with the base of the appropriate cartridge C¹ in the feed box, but following the removal of the last round in the feed box the ejector 23 is free to move forwardly on its pivot so that its lower end bears against the uppermost point of the base of the cartridge case and pushes such case downwardly beyond the spring loaded detent. Excepting when the last cartridge case is to be ejected the ejector 23 is prevented from

being pressed forwardly by its spring 26 when the cartridge is positioned (as in Figure 2) in the loading position, by the lower edge of this ejector abutting against a step 28 on the front end of the breech block, thus causing the ejector to be pushed upwards relatively to the carrier so that the lower part of the ejector lies behind the corner piece 15a of the carrier. The extractor is formed with a recess or step 23a adapted to slip over the corner piece 15a when the extractor comes opposite the empty feed box 18 (see Figure 3) so that it cannot now be moved upwardly relatively to the slide 25 and forms a positive abutment to engage and eject the last cartridge case as in Figure 4.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A machine gun of the Vickers type in which the firing pin is operated during the locking action of a side lever actuating a reciprocating breech block, wherein the firing pin is displaceable to the firing position in and relatively to the breech block, and the side lever drives the firing pin forwardly relatively to the breech block to fire the gun upon closing the breech.

2. A machine gun of the Vickers type in which the firing pin is operated during the locking action of a side lever actuating a reciprocating breech block, wherein the side lever is pivoted to the breech block, and the firing pin is displaceable in and relatively to the breech block, and the firing pin and the said lever have co-operating opposed parts adapted to be abutted together when the lever is moved into the locked position, the arrangement being such that when said co-operating opposed parts abut together the firing pin is urged forwardly at the completion of the locking movement of the said lever to fire the gun.

3. A machine gun according to claim 2 wherein the firing pin is carried by a body slidable within the breech block and has a trailing portion formed with a cam or inclined surface positioned for engagement with an abutment surface formed on the said lever when the lever is in the breech closed position, and spring means yieldingly opposing forward displacement of the firing pin to the firing position and operating to present the said cam or inclined surface of the firing pin for engagement by the said abutment surface of the lever.

4. A machine gun according to claim 3 wherein the breech block carries a relatively perpendicular guide adapted to receive the live rounds in succession from the supply source, said guide guiding a relatively

reciprocating abutment which is translated along the guide during the reciprocation of the breech block to urge each live round into the loading position on the breech block, and to eject the empty cartridge case from the breech block by reason of the movement of the appropriate live round against the empty cartridge case.

5. A machine gun according to claim 4 wherein the said abutment has associated with it an ejector member adapted to eject the appropriate cartridge case from the breech block when the supply of ammunition is exhausted, said ejector member normally being held in an inoperative position in rear of said abutment by the engagement therewith of the base of a live round during the transfer of the live round from the supply source to the loading position.

6. A machine gun according to claim 5 wherein said abutment and ejector member are carried by a carrier adapted to be reciprocated transversely relatively to the axis of reciprocation of the breech block, and the machine gun accommodates an island type of cam adapted to impart reciprocation to the said carrier during reciprocation of the breech block, the breech block having formed at its leading end a spring loaded detent adapted to serve as an abutment for positioning the round in operative alignment with the firing pin, and the said abutment being adapted to urge the rounds downwardly into engagement with the said spring loaded abutment, said ejector being spring loaded to the operative position and whereby upon the supply of ammunition becoming exhausted the said spring loaded ejector is urged forwardly to an operative position for engagement with the cartridge case appropriate to the last round fired so as to eject the cartridge case from the leading end of the breech consequent upon recoil of the breech.

7. A machine gun according to claim 6 wherein the said ejector is displaced relatively to the carrier by engaging a fixed abutment on the leading end of the breech block when a round is being urged by the abutment of the carrier into alignment with the firing pin.

8. A breech mechanism for a machine gun of the Vickers type substantially as hereinbefore described with reference to the accompanying drawings.

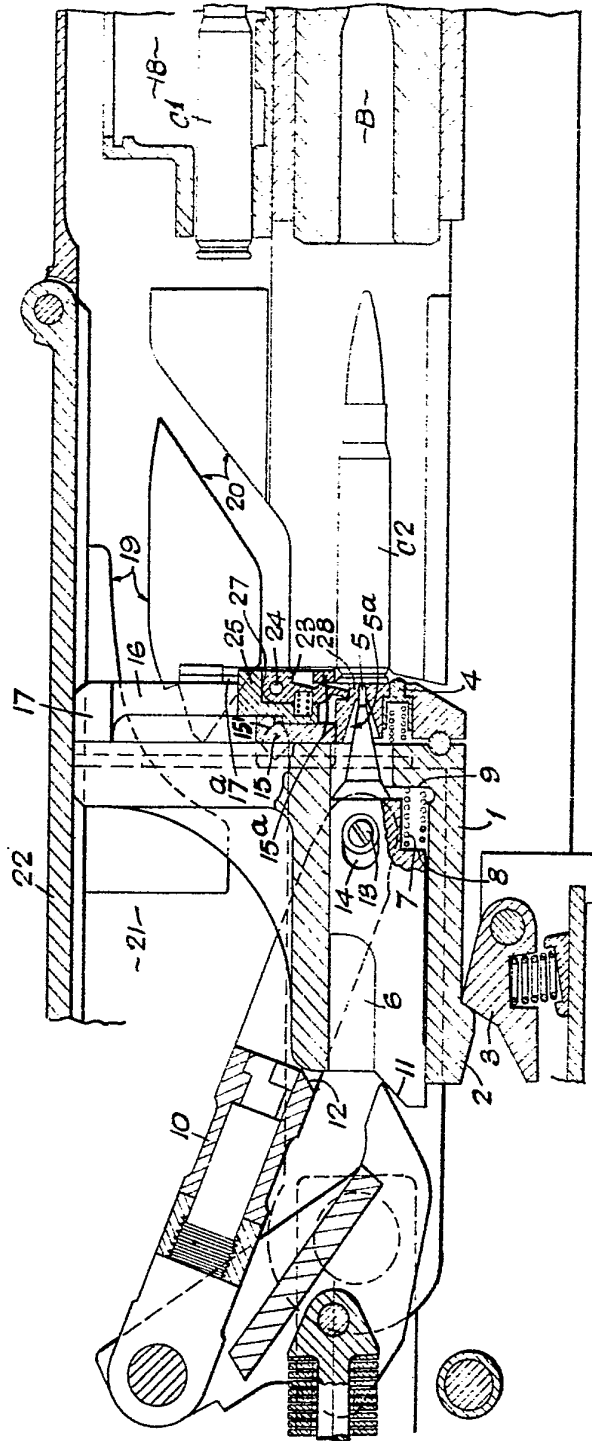
Dated this 3rd day of October, 1946.

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FIG. 2.



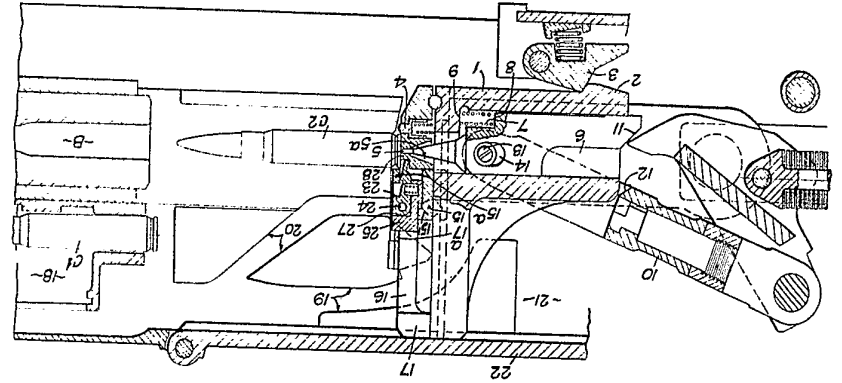


Fig. 2.

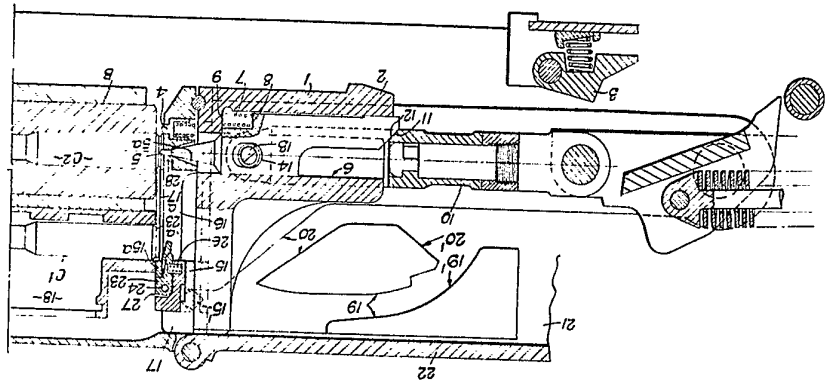
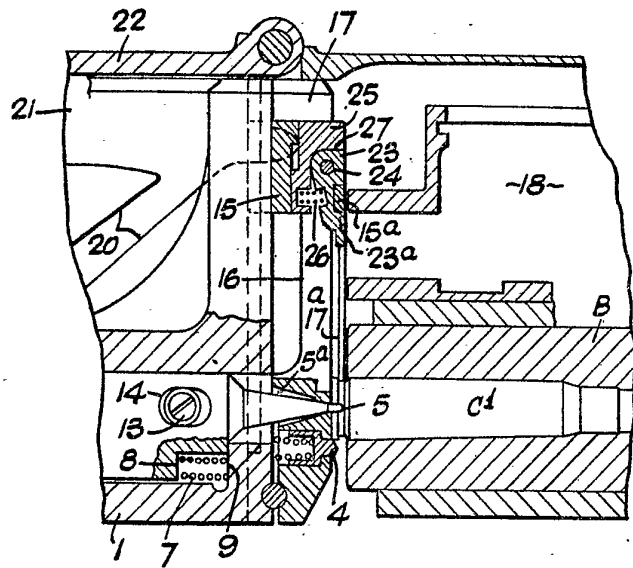


Fig. 1.

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[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 3.



[This Drawing is a reproduction of the Original on a reduced scale.]

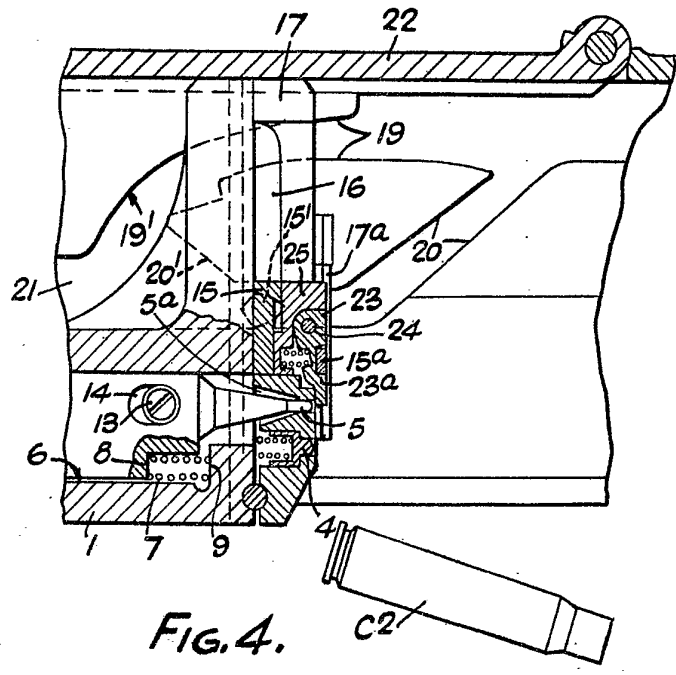


FIG. 4.