Nov. 17, 1925.

L. TUCKER

1,561,756

TRIGGER MECHANISM OF MACHINE GUNS AND AUTOMATIC SMALL ARMS

Filed July 27, 1925

Fig. 1.

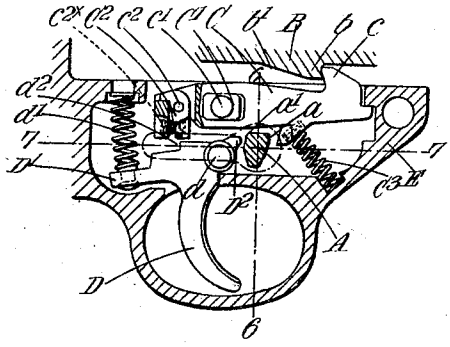


Fig. 6.

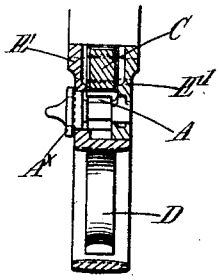


Fig. 7.

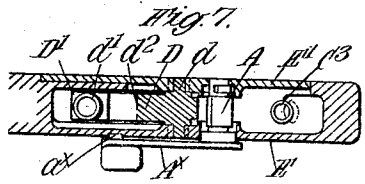


Fig. 2.

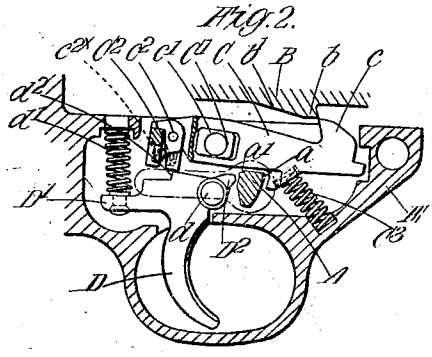


Fig. 3.

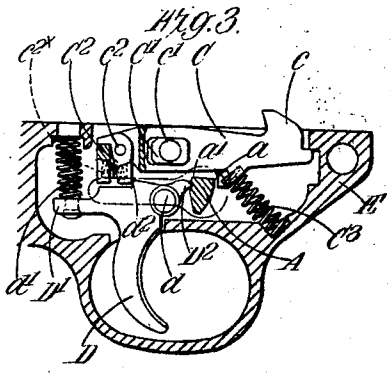


Fig. 4.

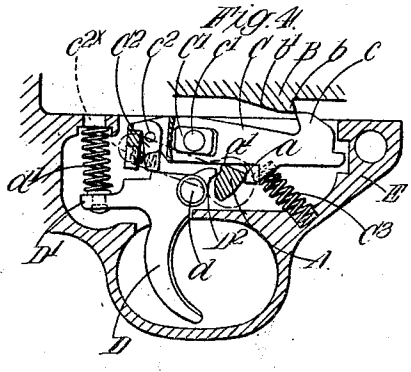
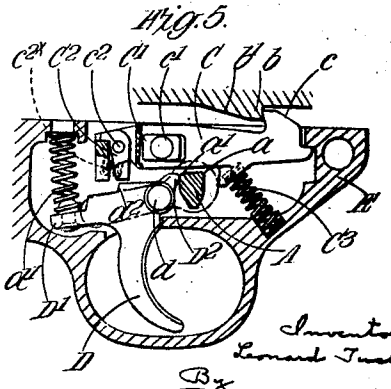


Fig. 5.



Inventor
Leonard Tucker
By
Attorney

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UNITED STATES PATENT OFFICE.

LEONARD TUCKER, OF CLAPHAM COMMON, LONDON, ENGLAND, ASSIGNOR TO VICKERS LIMITED, OF WESTMINSTER, ENGLAND, A BRITISH COMPANY.

TRIGGER MECHANISM OF MACHINE GUNS AND AUTOMATIC SMALL ARMS.

Application filed July 27, 1925. Serial No. 46,190.

To all whom it may concern:

Be it known that I, LEONARD TUCKER, a subject of the King of Great Britain, residing at 14 Salcombe Gardens, Clapham Common, in the county of London, England, have invented certain new and useful Improvements in or Relating to the Trigger Mechanism of Machine Guns and Automatic Small Arms, of which the following is a specification.

This invention relates to the trigger mechanism of machine guns and automatic small arms in which an adjustable device is provided for enabling the weapon to be converted, at will, from an automatic weapon into a single shot weapon, that is to say into a weapon in which only one shot is fired each time the trigger is operated. In known trigger mechanism of this kind the sear, which holds the firing member (i. e., the striker) in the cocked position, is displaced into the disengaged position by the movement of the trigger, the parts being so arranged that, when the aforesaid device is adjusted to fire single shots, the connection between the sear and the trigger is broken by the continued motion of the latter immediately the firing member is released. The sear is then returned to its normal position by a spring in readiness to re-engage with the firing member as soon as the weapon is cocked by its automatic action. It is found in practice that the motion of the trigger is not always continued after the firing member has been released, with the result that the sear may be held in the disengaged position and two or more shots therefore fired by one operation of the trigger. This is objectionable as ammunition is wasted and the presence of an automatic weapon may be prematurely disclosed to the enemy. The chief object of the present invention is to provide a simple and compact trigger mechanism which can be adjusted to "automatic fire," and "single fire" as hithereto, but which will not allow more than one shot to be fired at each operation of the trigger when the aforesaid device is set to "single fire."

According to the invention the sear is made longitudinally movable and is placed under the influence of a spring in such a manner that when the said adjustable device occupies the "single fire" position and the sear is rocked by the trigger to release the firing member, the said spring will displace the sear rearwardly into a position in which the sear becomes disengaged from the trigger irrespective of whether or not any further movement is given to the trigger by the marksman, the sear then rocking into re-engagement with the firing member as the weapon is recocked. The liability of more than one shot being fired by a single operation of the trigger is thus obviated. In the "automatic fire" position of the said adjustable device a part thereof prevents the above-mentioned rearward movement of the sear from occurring and another part may, at the same time, limit the rocking movement of the sear to release the firing member.

In order that the said invention may be clearly understood and readily carried into effect, the same will now be described more fully with reference to the accompanying drawings, in which:—

Figure 1 is a side elevation of a constructional form of trigger mechanism in accordance with this invention, the adjustable device being shewn in the "single fire" position and the sear in engagement with the firing member.

Figure 2 is a view similar to Figure 1 except that the parts of the trigger mechanism are shewn in the position they occupy at the moment of release of the firing member.

Figure 3 is a view similar to Figure 2 shewing the position of the parts when the trigger is pulled completely back.

Figure 4 is a view similar to Figure 1 except that the adjustable device is shewn in the "automatic fire" position, the parts of the trigger mechanism being in the position they occupy at the moment of release of the firing member.

Figure 5 is a view similar to Figure 1 except that the adjustable device is shewn in the "safe" position, and

Figures 6 and 7 are sections taken on the lines 6, 6 and 7, 7 of Figure 1.

A is the aforesaid adjustable device. B is the firing member (i. e., the striker). C is the sear which has a nose *c* for engaging with a bent *b* on the striker B and D is the trigger.

The various members comprising the trig-

ger mechanism are mounted in a frame E which is preferably made integral with, and forms a forward extension of, the end piece of the weapon. This frame has a detachable side plate E^1 (Figures 6 and 7) which permits easy access to be had to the trigger mechanism. The aforesaid adjustable device A is constituted by an angularly adjustable stop member (of a shape hereinafter described) mounted transversely in the frame and adapted to engage with the side plate E^1 by means of a bayonet joint connection as shewn in Figures 6 and 7 so that by moving the stop member into the "dismantle" position the side plate E^1 can be withdrawn from the frame E. The said stop member A has a lever or handle A^x in the form of a flat spring disposed outside the frame, the extremity of the spring having a small inward projection a^x (Figure 7) adapted to engage with suitable notches in the frame to determine its correct positions of which there are three (apart from the "dismantle" position) viz, the "single fire" position, the "automatic fire" position, and the "safe" position.

The sear C has a slot by which it can slide longitudinally on a block C^1 forming part of an axis pin c^1 pivoted in the frame E and has pivoted at c^2 in another slot at its rear part a spring-controlled pawl C^2 the lower end of which normally rests on the upper surface of the trigger D which is pivotally mounted at d in the frame. The pawl C^2 is controlled by a spring c^{2x} interposed between it and the rear wall of its slot in the sear, and the trigger D is controlled by a spring d^1 interposed between part of the frame E and a tail piece D^1 on the trigger. C^3 is the sear spring which is interposed between a part of the frame E and a part of the sear in front of the axis pin C^1. This spring is disposed at an angle to the direction of the sliding movement of the sear C so that the said spring serves the dual purpose of resiliently holding the nose c of the sear in engagement with the bent b on the striker B and of moving the sear to its rearmost position when the said nose of the sear is disengaged from the said bent on the striker.

The aforesaid stop member A is shaped as shewn in the drawings and when it occupies the "single fire" position shewn in Figures 1, 2 and 3 it is entirely out of the path of a downward projection C^4 on the sear C. Thus when the nose c of the sear C is liberated from the bent b on the striker B (as shown in Figure 2) by pulling the trigger D, the sear spring C^3 operates to displace the sear C towards the rear as shewn in Figure 3 (the sear sliding upon the aforesaid block C^1 on the axis pin c^1) so as to move the aforesaid pawl C^2 out of contact with the upper surface of the trigger D, it being understood that the angular movements of the trigger D and the sear C when the trigger was pulled has materially reduced the normal area of contact between the upper surface of the trigger and the pawl C^2 as will be seen by a comparison between Figures 1 and 2. The striker B has now moved forward to fire the gun and the sear C is free to rock under the upward pressure of the sear spring C^3 until the sear regains its normal position ready for its nose c to re-engage with the bent b on the striker B on the return movement of the latter, the sear being depresed against the action of its spring C^3 by the co-operation of an inclined surface b^1 on the striker with the nose c of the sear. When the nose c and the bent b re-engage the forward pressure of the striker spring moves the sear C longitudinally in a forward direction against the resistance of the spring C^3. When the trigger D is pulled to a position beyond that shewn in Figure 2 into the position shewn in Figure 3 and held in the latter position until the sear C has been moved in a forward direction as above described, the front lower part of the pawl C^2 will bear against a shoulder d^2 on the trigger and the pawl will thus be displaced to the rear about its pivot c^2 and against the resistance of its spring c^{2x}, but will be caused by the said spring to resume its normal position shewn in Figure 1 when the pull on the trigger has been released and the trigger returned to its normal position by its spring d^1. It will be seen that the sear is disengaged from the trigger immediately the striker has escaped, without any "overdraw" of the trigger, but in the event of the sear sticking or binding on the block C^1 of the axis pin c^1 so that the sear is unable to move to the rear under the pressure of its spring C^3, a continued movement of the trigger after the striker has been released will cause the upper surface of the trigger to slip from under the pawl C^2. The movement of the trigger will then be arrested by a toe D^2 thereon coming into contact with the stop member A and the sear is free to rock under the influence of its spring to re-engage with the bent on the striker. When the pull on the trigger is released the aforesaid shoulder d^2 thereon presses against the front lower portion of the pawl C^2 which is thus swung about its axis pin c^2 to allow the trigger to pass. As soon as the trigger has regained its normal position shewn in Figure 1 the pawl spring c^{2x} returns the pawl C^2 to its normal position shewn in Figure 1.

When the stop member A occupies the "automatic fire" position, shewn in Figure 4 a corner or projection a thereon bears against or is arranged very close to the rear surface of the aforesaid downward projection C^4 on the sear C so as to hold the latter in its forward position without, however,

impeding its rocking movement about the axis pin c^1. As the sear C cannot move rearwards under the influence of its spring C^3, the pawl C^2 will remain in contact with the upper surface of the trigger D and consequently the weapon fires automatically so long as the pull on the trigger is maintained. The stop member A has a second corner or projection a^1 which, in the "automatic fire" position, limits the downward movement of the sear C as shewn in Figure 4 and thereby prevents the pawl C^2 from becoming disengaged from the upper surface of the trigger D by excessive movement of the latter.

When the stop member A occupies the "safe" position shewn in Figure 5 the corner or projection a^1 on the said member bears against the toe D^2 of the trigger D. The trigger is thereby locked in its normal position and cannot be moved in the direction to operate the sear, but at the same time the sear C remains free to move so that in the event of the weapon being manually cocked with the stop member A occupying the "safe" position, the sear can be rocked on its axis pin c^1 by the co-operation of the inclined surface b^1 on the striker B with the nose c of the sear so as to enable this nose to engage in front of the bent b on the striker, the engagement being effected by the sear spring C^3.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In trigger mechanism for machine guns and automatic small arms having an adjustable device for enabling the weapon to be converted, at will, from an automatic weapon into a single fire weapon, the combination with the trigger, the pivoted sear and the firing member with which said sear engages, of means for mounting said sear so that it can move bodily as well as rock about its pivot, and a spring which, when said adjustable device occupies the "single fire" position, moves said sear in a rearward direction, when disengaged from the firing member, so as to disengage it from the trigger.

2. In trigger mechanism for machine guns and automatic small arms having an adjustable device for enabling the weapon to be converted, at will, from an automatic weapon into a single fire weapon, the combination with the trigger, the pivoted sear and the firing member with which said sear engages, of means for mounting said sear so that it can move longitudinally, and a spring which, when said adjustable device occupies the "single fire" position, moves said sear rearwardly, when disengaged from the firing member, so as to disengage it from the trigger.

3. In trigger mechanism for machine guns and automatic small arms having an adjustable device for enabling the weapon to be converted, at will, from an automatic weapon into a single fire weapon, the combination with the trigger, the pivoted sear and the firing member with which said sear engages, of means for mounting said sear so that it can move longitudinally as well as rock about its pivot, a spring-controlled pawl interposed between said sear and said trigger and a spring which, when said adjustable device occupies the "single fire" position, moves said sear rearwardly, when disengaged from the firing member, to break the operative relationship between the trigger and the pawl.

4. In a trigger mechanism for machine guns and automatic small arms having an adjustable device for enabling the weapon to be converted, at will, from an automatic weapon into a single fire weapon, the combination with the trigger, the pivoted sear and the firing member with which said sear engages, of means for mounting said sear so that it can move longitudinally as well as rock about its pivot, a spring-controlled pawl carried by said sear and normally arranged in operative relationship with said trigger and a spring which, when said adjustable device occupies the "single fire" position, moves said sear rearwardly, when disengaged from the firing member, to carry said pawl out of operative relationship with respect to the trigger.

5. In trigger mechanism for machine guns and automatic small arms having an adjustable device for enabling the weapon to be converted, at will, from an automatic weapon into a single fire weapon, the combination with the trigger, the pivoted sear and the firing member with which said sear engages, of means for mounting said sear so that it can move longitudinally, and a spring which, when said adjustable device occupies the "single fire" position, moves said sear rearwardly, when disengaged from the firing member, so as to disengage it from the trigger, and a projection on said adjustable device serving, when said device occupies the "automatic fire" position, to prevent said sear from moving rearwards.

6. In trigger mechanism for machine guns and automatic small arms having an adjustable device for enabling the weapon to be converted, at will, from an automatic weapon into a single fire weapon, the combination with the trigger, the pivoted sear and the firing member with which said sear engages, of means for mounting said sear so that it can move longitudinally, and projections on said adjustable device serving, when said device occupies the "automatic fire" position, to prevent said

sear from moving rearwards and to limit the rocking movement of said sear to release the firing member.

7. In trigger mechanism for machine guns and automatic small arms having an adjustable device for enabling the weapon to be converted, at will, from an automatic weapon into a single fire weapon, the combination with the trigger, the sear and the firing member with which said sear engages, of means for mounting said sear so that it can move longitudinally in addition to performing its movement into and out of engagement with said firing member, and a spring which, when said adjustable device occupies the "single fire" position, moves said sear in a rearward direction, when disengaged from the firing member, so as to disengage it from the trigger.

LEONARD TUCKER.