

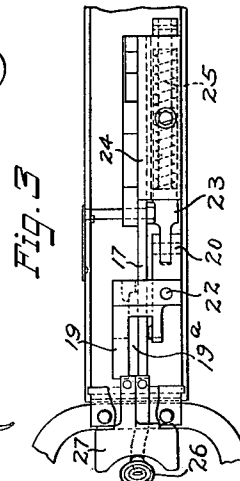
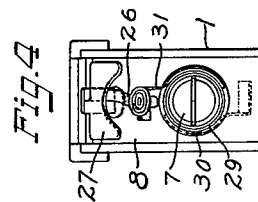
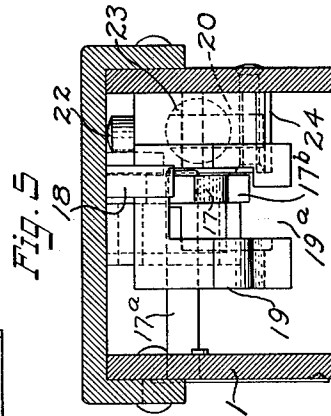
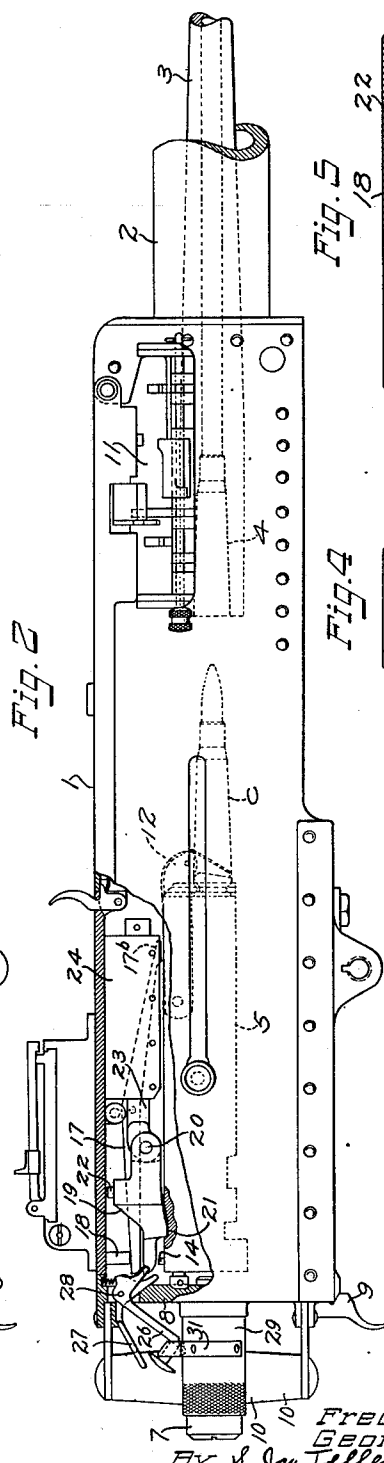
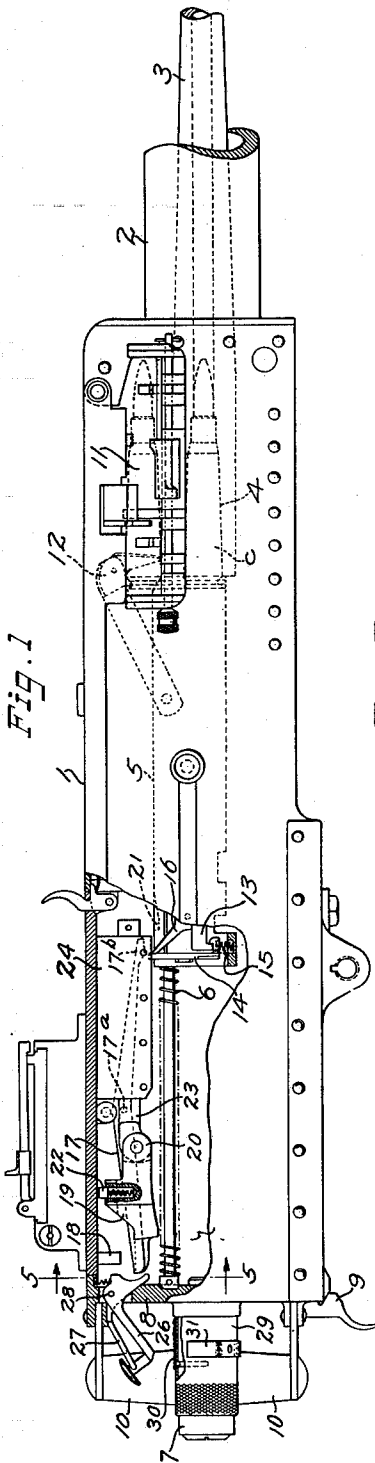
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F. T. MOORE ET AL

2,050,539

FIRING MECHANISM FOR MACHINE GUNS

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FIRING MECHANISM FOR MACHINE GUNS

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Application October 18, 1932, Serial No. 638,420

8 Claims. (Cl. 89—27)

The present invention is particularly applicable to automatic firearms of the type disclosed in patents to John M. Browning No. 1,293,021 dated February 4, 1919 and No. 1,628,226 dated May 10, 1927; but the invention is not necessarily so limited.

In an automatic firearm of the type described the cartridges are automatically supplied to the gun, as by means of a flexible belt, and if firing is discontinued before the cartridge supply is exhausted a live cartridge remains in the firing chamber of the barrel. If the gun has been operated continuously for a substantial period of time the barrel may be quite hot, particularly if the gun is not provided with a liquid-containing cooling mechanism. The heat of the barrel is transmitted to the cartridge in the firing chamber, with the possible result that the cartridge is exploded and there occurs a delayed and unexpected firing of the gun. Such delayed firing is obviously very dangerous.

In accordance with the invention set forth in the copending application of Frederick T. Moore for Automatic firearms, Serial No. 530,825 filed April 17, 1931 the breech bolt, instead of being in its forward position at the conclusion of firing, is held in its rearward position, and the construction of the gun is such that the cartridge is thus maintained in a rearward position and is prevented from entering the chamber of the heated barrel. When resumption of firing is desired the breech bolt may be released and permitted to move forward in the usual way.

The present invention is particularly applicable to a machine gun incorporating the invention set forth and claimed in the aforesaid copending application, but as to some of its features it is not necessarily so limited. By the present invention we attain a flexibility of control which was impossible with the earlier construction and we make it possible for the gun to be fired in any one of several different ways.

In accordance with one phase of the present invention we provide two separate independently movable triggers which can be operated simultaneously to fire the gun, or which, if preferred, can be operated successively. If either one of the triggers is pressed separately firing does not occur, but the gun mechanism is so prepared or adapted that repetitive firing can be subsequently effected by the pressing of the remaining trigger.

In accordance with another phase of the invention we provide mechanism which makes it possible for the firing to be so controlled that

upon cessation of firing the breech bolt will be automatically retained either in the rearward or in the forward position as the gunner may elect.

Further in accordance with the invention it is possible, with the gun idle, to release the breech bolt for movement from its rearward position to its forward position without effecting firing, this action being difficult or impossible with the construction set forth in the before-mentioned prior application.

Other objects of the invention will be apparent from the following specification and claims.

In the accompanying drawing we have shown the embodiment of the invention which we now deem preferable, but it will be understood that the drawing is intended for illustrative purposes only and is not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawing:

Fig. 1 is a combined side and longitudinal sectional view of a firearm embodying the invention.

Fig. 2 is a view similar to Fig. 1, but showing the operative parts in different relative positions.

Fig. 3 is a fragmentary plan view of the mechanism shown in Fig. 1, the top plate of the gun being assumed to have been removed.

Fig. 4 is a fragmentary rear view of the gun with the parts in the same positions as in Fig. 2.

Fig. 5 is an enlarged fragmentary transverse sectional view taken along the line 5—5 of Fig. 1.

Referring to the drawing, 1 represents as an entirety the breech or main casing of the gun which is generally rectangular in transverse section. Projecting from the casing 1 at the forward end is a cylindrical jacket 2 which surrounds a barrel 3 having a firing chamber 4 at the rear end thereof. Located within the casing is a breech bolt 5 which is held in locked relationship with the barrel at the time of firing, but which is movable rearward separately from the barrel as the result of the recoil action. Following recoil the breech bolt is returned in the forward direction by a suitable means such as a reaction spring 6. A buffer is provided for limiting the rearward movement of the breech bolt, this buffer being contained in part in a tube 7 projecting from the casing at the rear thereof.

Preferably the tube 7 is carried by a removable

plate 8 constituting the rear wall of the casing. The side walls of the casing are grooved to permit the plate 8 to move vertically. The plate is normally held in position by a latch at 9, and when the latch is released the plate can be moved upward and separated from the gun. The handles 10, 10 are carried by the plate 8 and are removable therewith.

The cartridges are fed to the gun by means of a flexible belt which passes through a transverse feed channel 11 in the forward part of the casing 1, and the breech bolt 5 carries an extractor 12 which serves to withdraw a cartridge from the belt upon each rearward movement of the bolt. Fig. 2 shows a cartridge C in the position which it occupies when the breech bolt and extractor are in their rearmost positions. It will be apparent that when the breech bolt and extractor again move forward the cartridge C is pushed into the firing chamber 4.

The breech bolt 5 carries a firing pin 13, the rear portion of which is shown in Fig. 1. This firing pin is engaged by a vertically movable sear 14, the sear being held in engagement by the firing pin by means of a spring 15. A pivoted cocking lever 16 serves to move the firing pin relatively rearward during rearward movement of the breech bolt. Mounted on the casing is a sear actuating member 17 which is so located as to be adapted to engage the sear 14 when the breech bolt and sear are in their forward positions. We do not limit ourselves as concerns the exact construction of the member 17, but we prefer and have shown a member which is horizontally pivoted between its ends at 17^a, the forward end of the bar 17^b being positioned and shaped to engage the sear as already described. A stop 18 limits the movement of the member 17. When the forward end of the member is in its lower position, the sear will be depressed whenever the breech bolt is in its forward position.

The mechanism of the gun for effecting and controlling the movements of the breech bolt, the extractor and other parts is not shown in detail, as this mechanism does not of itself constitute any part of the invention and is, or may be, similar to those shown in the before-mentioned patents to John M. Browning. It is sufficient to say that the mechanism is adapted to automatically effect feeding, loading, firing and ejection in rapid repetitive succession.

Mounted in the casing near the rear thereof is a locking member 19 which is adapted to engage the breech bolt to hold it in its rearward position as shown in Fig. 2. This locking member or holding means is preferably a pivoted pawl having a horizontal transverse pivotal support at 20. The breech bolt 5 has a notch 21 therein into which the pawl 19 may enter to engage and hold the breech bolt. The pawl 19 may be automatically moved into the notch 21 by gravity, but preferably a spring plunger 22 is provided for this purpose. It will be apparent that if the pawl 19 is allowed to act normally it will engage and hold the breech bolt whenever the breech bolt is moved to its rearward position. The pawl 19 is preferably relatively wide so as to have extended engagement with the breech bolt, and it is provided with a central notch 19^a through which the pivoted sear actuating member 17 extends.

Preferably the pivotal axis at 20 for the pawl 19, instead of being in fixed relationship to the casing, is relatively movable. The pawl is pivotally connected to the rear portion of a hori-

zontal rod 23, which is longitudinally movable in a housing 24 secured to the casing. A spring 25 surrounds the rod 23 and tends to hold it in its rearmost position, the spring thus constituting an element of the means for holding the breech bolt. The spring 25 serves to absorb the rebound which occurs when the breech bolt engages the buffer, thus eliminating the shock and vibration which would occur if pivotal connection for the pawl 19 were fixedly and rigidly mounted.

The sear actuating member 17 and the bolt engaging pawl 19 constitute means or mechanism for starting, stopping and controlling the before-referred to repetitive automatic action of the gun. The said member 17 and the said pawl 19 are operatively associated respectively with two triggers 26 and 27 which are separately movable. When the trigger 26 is depressed as shown in Fig. 2 the sear actuating member or trigger bar 17 is moved in the clockwise direction so that the forward end thereof is moved to its lower sear engaging position as shown in Fig. 2. When the trigger 27 is depressed the pawl 19 is lifted in opposition to the action of the spring plunger 22 so as to be out of engagement with the breech bolt 5, the said breech bolt being thus free to be moved forward by the reaction spring 6.

Preferably the two triggers 26 and 27 are located at the rear of the casing and are mounted for pivotal movement about a common transverse axis at 28. By preference and as shown, the said triggers are mounted on the removable back plate 8 so as to be removable therewith. The triggers are positioned between the handles 10, 10 so as to be conveniently engaged by the operator's thumb. The triggers are positioned close together so that the operator can conveniently depress either or both of them without substantially changing the position of his hand.

Under some conditions it is desirable to lock the trigger 26 in its depressed position, and for this purpose we preferably provide a sleeve 29 which is rotatable on the tube 7, being held against longitudinal movement by means of a spring finger 30 engaging a circumferentially extending groove in the tube. Carried by the sleeve 29 is a hook 31 which is adapted to engage the trigger 26 to hold it in its lower position as shown in Figs. 2 and 4. When the sleeve 29 and the hook 31 are moved to the position shown by dotted lines in Fig. 4 the trigger 26 is released and is automatically returned to its normal position as shown in Fig. 1.

As already stated a gun embodying the present invention can be operated or fired in any one of several different ways. For instance, if desired, it may be fired by depressing both of the triggers 26 and 27 simultaneously. The depressing of the trigger 27 elevates the pawl 19 so that it is out of engagement with the breech bolt and the depressing of the trigger 26 changes the position of the member 17 so that the sear 14 is actuated to release the firing pin 13 and thus effect firing. So long as both triggers are depressed the gun will continue to operate to effect firing in rapid succession, provided, of course, that the supply of cartridges is not exhausted.

If desired either one of the triggers 26 or 27 can be depressed in advance of the other, it being obvious that such depressing of only one of the triggers will merely prepare or adapt the gun mechanism for continuous repetitive automatic action but will not actually effect such continuous repetitive action. If the trigger 26 is depressed in advance of the trigger 27 with the breech bolt

forward as shown in Fig. 1 one shot will be fired, but the breech bolt will then be retained in its rearward position, thus preventing the firing of any additional shots. If the breech bolt is in its rearward position as shown in Fig. 2 when the trigger 26 is depressed, nothing occurs beyond the preparation or adaptation of the mechanism for subsequent repetitive automatic firing, it being apparent that the forward end of the member 17 is brought into position to be subsequently engaged by the sear 14 when the breech bolt subsequently moves forward.

If the trigger 27 is depressed in advance of the trigger 26 with the breech bolt forward as shown in Fig. 1, nothing occurs beyond the preparation or adaptation of the mechanism for subsequent repetitive automatic firing, it being apparent that the pawl 19 is merely moved out of its bolt engaging position. If the breech bolt is in its rearward position as shown in Fig. 2 when the trigger 27 is depressed, the said bolt will be permitted to move from its rearward position to its forward position, but inasmuch as the trigger 26 and the trigger bar 17 are in their normal inoperative positions, firing will not take place.

After either one of the triggers has been depressed and the mechanism thus prepared or adapted for repetitive automatic action as before explained, repetitive automatic firing of the gun can then be started and stopped by depressing and releasing the trigger which was not initially depressed.

With both triggers depressed, whether depressed simultaneously or successively, the repetitive automatic action of the gun will continue so long as there is a supply of cartridges. The action can be stopped by releasing either one of the triggers and by the proper selection of triggers the gun can be stopped with the breech bolt either in its forward position as shown in Fig. 1 or in its rearward position as shown in Fig. 2. If the trigger 26 is first released, the trigger 27 being maintained in its depressed position, the breech bolt will stop in its forward position as shown in Fig. 1. This will leave a cartridge in the firing chamber of the barrel and the gun is fully loaded ready for the instantaneous firing of a shot when the trigger 26 is again depressed.

If the trigger 27 is first released, the trigger 26 being maintained in its depressed position, the breech bolt will be stopped in its rearward position as shown in Fig. 2. With the breech bolt in this position the gun is not fully loaded and there is no cartridge in the firing chamber. In this way there is complete elimination of the before-mentioned danger of delayed firing, due to the explosion of the cartridge by heat derived from the hot barrel.

Ordinarily it is preferable to so operate the gun that the breech bolt is retained in its rearward position at the conclusion of firing. It is, therefore, ordinarily preferred to first depress the trigger 26 and to hold it in depressed position by means of the before-described hook 31. With the trigger 26 thus held, the action of the gun can be started and stopped by means of the trigger 27. At the conclusion of firing the breech bolt will always be held in its rearward position. If, after the conclusion of firing, it is desired to release the breech bolt and permit it to move to its forward position without effecting firing, this can be done by first releasing the trigger 26 and then depressing the trigger 27.

What we claim is:

1. In a machine gun comprising a casing and

mechanism within the casing for automatically effecting feeding, loading, firing and ejection in rapid repetitive succession, the combination of two separately movable triggers, means within the casing serving to prevent the said automatic repetitive action when both triggers are in normal positions and when either trigger is in normal position, means operatively associated with the said triggers for enabling either of them when moved separately to prepare or adapt the gun mechanism for repetitive automatic action, and means within the casing for enabling the other of the said triggers after the said separate movement of the first to start and stop the said automatic action.

2. In a machine gun comprising a casing and mechanism within the casing for automatically effecting feeding, loading, firing and ejection in rapid repetitive succession which mechanism includes a longitudinally reciprocable breech bolt, the combination with the said mechanism of a trigger, means operatively associated with the trigger for starting the said repetitive automatic action of the gun when the trigger is pressed and for stopping the said action when the trigger is released, a second trigger movable independently of the first said trigger, and means within the casing operatively controlled by the said second trigger and adapted to directly engage the bolt to releasably hold it in its rearward position.

3. In a machine gun comprising a casing and mechanism within the casing for automatically effecting feeding, loading, firing and ejection in rapid repetitive succession which mechanism includes a longitudinally reciprocable breech bolt, the combination with the said mechanism of two separately movable triggers, and means within the casing operatively associated with the said triggers for starting the said repetitive automatic action of the gun when both triggers are pressed and for stopping the said action when either trigger is released, the said means causing the breech bolt to stop in its forward position when one trigger is released and to stop in its rearward position when the other trigger is released.

4. In an automatic firearm of the class described, the combination of a main casing, a barrel, a breech bolt movable upon recoil rearward separately from the barrel, means adapted to return the breech bolt in the forward direction after recoil, a firing pin and a sear therefore carried by the movable breech bolt, a locking member on the casing adapted to engage the breech bolt to hold it in its rearward position, a movable member adapted to engage and actuate the sear to release the firing pin when the bolt is in its forward position, and two separate triggers at the rear of the gun independently movable about a common transverse axis, one of the triggers being adapted to engage and release the locking member and the other being adapted to engage and move the sear actuating member.

5. In an automatic firearm of the class described, the combination of a main casing having a removable back plate, a barrel, a breech bolt movable upon recoil rearward separately from the barrel, means adapted to return the breech bolt in the forward direction after recoil, a firing pin and a sear therefore carried by the movable breech bolt, a locking member on the casing adapted to engage the breech bolt to hold it in its rearward position, a movable member adapted to engage and actuate the sear to release the firing pin when the bolt is in its forward position,

and two separate independently movable triggers carried by the back plate and removable therewith, one of the triggers being adapted to engage and release the locking member and the other being adapted to engage and move the sear actuating member.

6. In a machine gun comprising mechanism for automatically effecting feeding, loading, firing and ejection in rapid repetitive succession, the combination of a casing, a trigger at the rear of the casing, means operatively associated with the trigger and serving to start and stop the said automatic action, a buffer tube projecting from the casing at the rear thereof, a sleeve rotatable on the tube, and a hook on the tube serving in one position to hold the trigger in its operative position and serving in another position to release the trigger.

7. In a machine gun comprising mechanism for automatically effecting feeding, loading, firing and ejection in rapid repetitive succession, the combination of a casing, two triggers in close proximity at the rear of the casing and separately movable to their operative positions, means with the casing serving to prevent the said automatic repetitive action when both triggers are in normal positions and when either trigger is in normal position, means operatively associated with one of the said triggers and serving when the trigger is moved separately to prepare or adapt the gun mechanism for repetitive automatic action, a buffer tube projecting from the casing

at the rear thereof, a sleeve rotatable on the tube, a hook on the tube serving in one position to hold the last said trigger in its operative position and serving in another position to release the trigger, and means operatively associated with the other trigger and serving after the said separate movement of the first trigger to start and stop the said automatic action.

8. In a machine gun comprising a casing and mechanism within the casing for automatically effecting feeding, loading, firing and ejection in rapid repetitive succession which mechanism includes a longitudinally reciprocable breech bolt, the combination with the said mechanism of a firing pin carried by the breech bolt, means carried by the breech bolt and serving to cock the firing pin upon rearward movement of the bolt, a sear on the breech bolt for holding the firing pin in cocked position, a trigger, means operatively associated with the trigger and engageable with the sear when the bolt is in its forward position, the said means serving to start the said repetitive automatic action of the gun when the trigger is pressed and to stop the said action with the bolt in its forward position when the trigger is released, a second trigger movable independently of the first said trigger, and means within the casing operatively controlled by the said second trigger and adapted to directly engage the bolt to releasably hold it in its rearward position.

FREDERICK T. MOORE.
GEORGE H. TANSLEY.

CERTIFICATE OF CORRECTION.

Patent No. 2,050,539.

August 11, 1936

FREDERICK T. MOORE, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 8, claim 1, after "means" insert the words within the casing; page 4, first column, line 25, claim 7, for the syllable "ing" read in; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 13th day of October, A. D. 1936.

(Seal)

Henry Van Arsdale
Acting Commissioner of Patents.

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