

Aug. 8, 1939.

W. L. SWARTZ

2,169,083

AUTOMATIC FIREARM

Filed June 14, 1937

2 Sheets-Sheet 1

Fig. 1

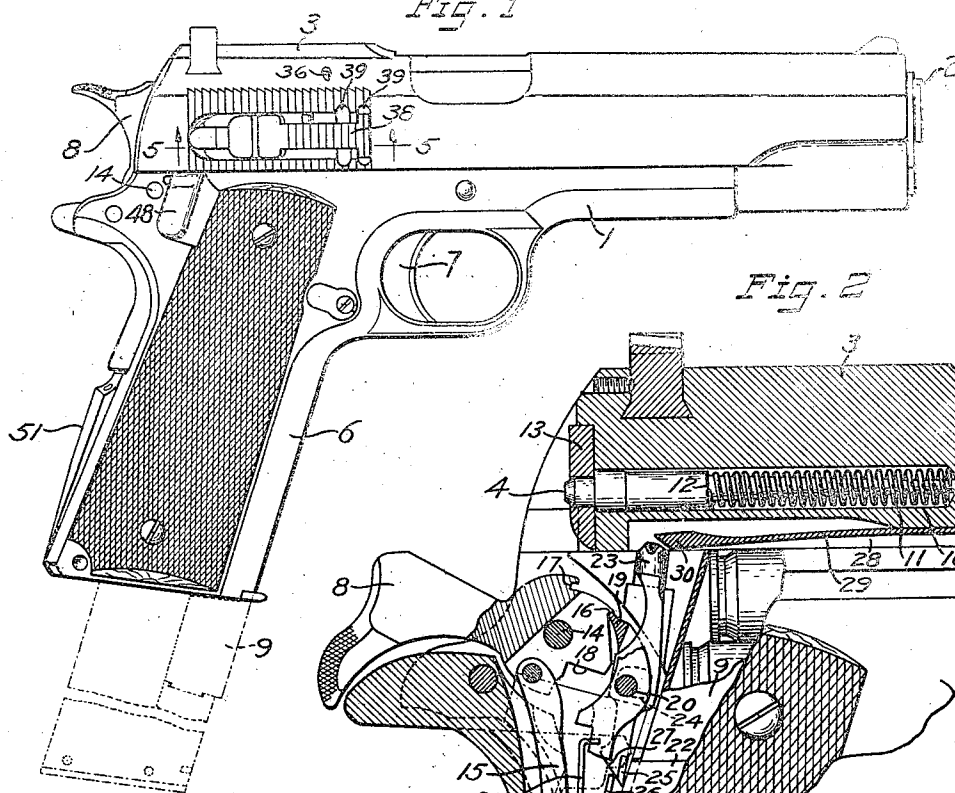


Fig. 2

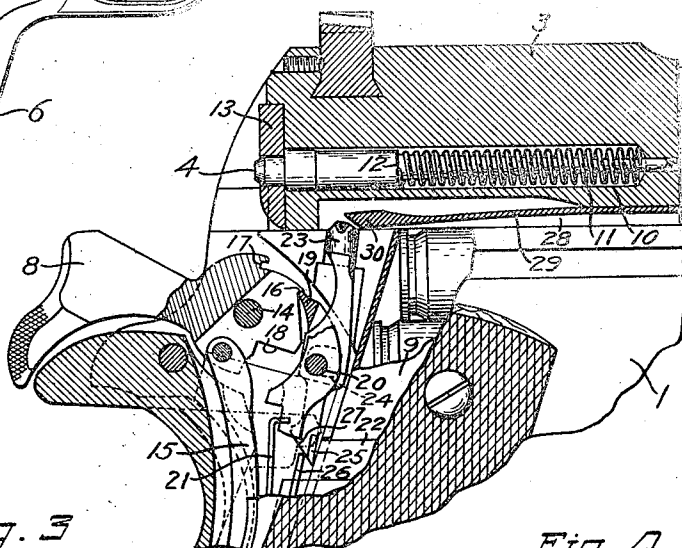


Fig. 3

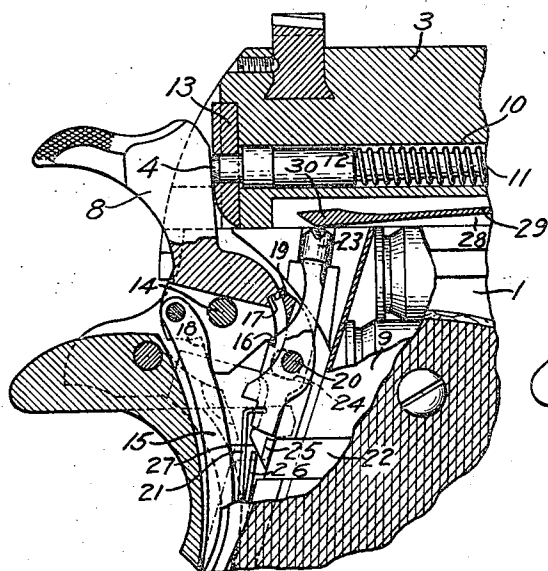
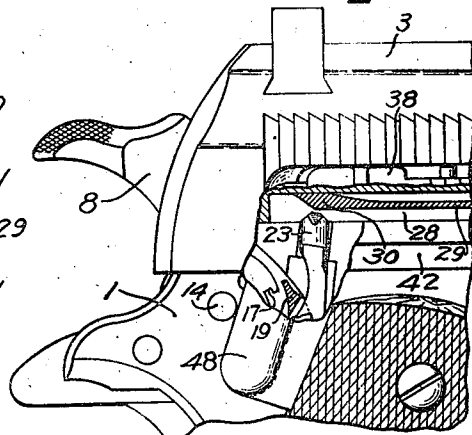


Fig. 4



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Fig. 5

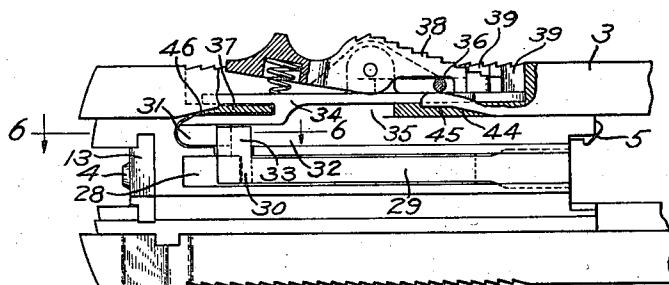


Fig. 6

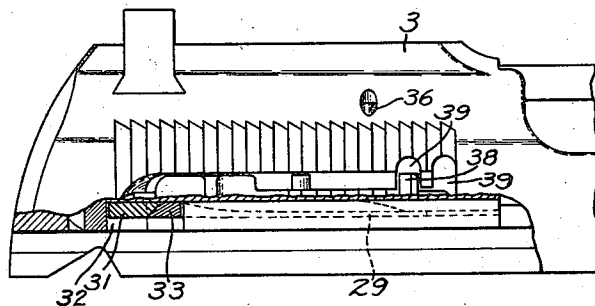


Fig. 7

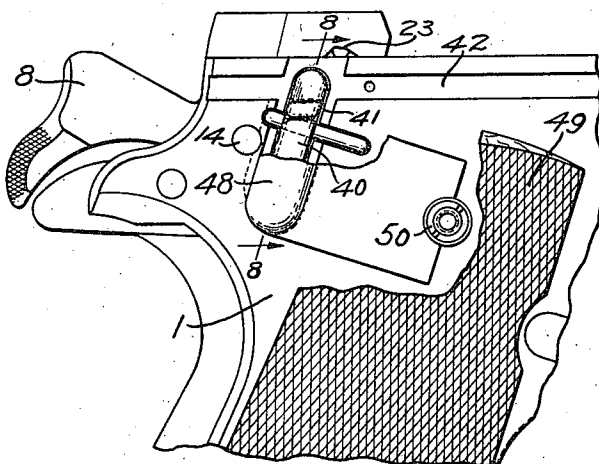


Fig. 8

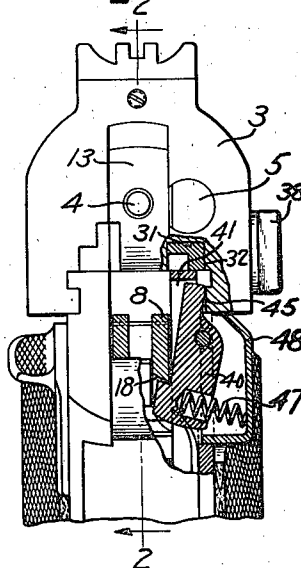
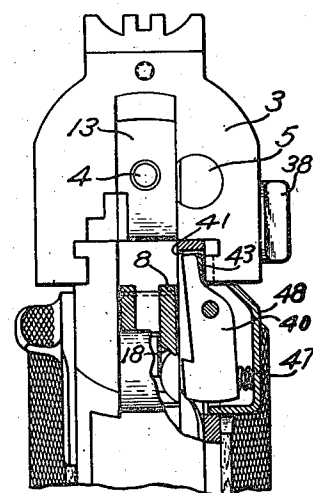


Fig. 9



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UNITED STATES PATENT OFFICE

2,169,083

AUTOMATIC FIREARM

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Company, Hartford, Conn., a corporation of
Connecticut

Application June 14, 1937, Serial No. 148,073

10 Claims. (Cl. 42—69)

One object of the invention is to provide a firearm including a reciprocable bolt and mechanism for preventing doubling, that is, the firing of more than a single shot upon a single operation of the trigger, with means on the bolt which may be adjusted so as to render the doubling preventing means operative or inoperative to permit the firearm to be selectively operated in either a semi or fully automatic manner.

Another object of the invention is to provide a firearm having a reciprocable bolt, a firing member, trigger mechanism, and a disconnecter constituting a connecting means between the trigger mechanism and sear and normally operable by the bolt to prevent doubling of shots, with means for rendering the disconnecter inoperative for preventing doubling whereby the firearm may be selectively operated in either a semi or fully automatic manner.

From this specification further objects and advantages of the invention will be apparent to those skilled in the art.

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

In the drawings:

Fig. 1 is a side elevation of a firearm having incorporated therein the principles of the invention.

Fig. 2 is an enlarged sectional view of the rear portion of the gun taken on the line 2—2 of Fig. 8 with the parts adjusted for semi automatic operation.

Fig. 3 is a view similar to Fig. 2 but showing the parts in the positions they occupy after the bolt has moved rearward a short distance.

Fig. 4 is a view similar to Fig. 3 but with the parts adjusted for fully automatic operation.

Fig. 5 is an enlarged bottom plan view of the bolt with certain parts broken away to show a section taken on the line 5—5 of Fig. 1 with the parts adjusted for fully automatic operation.

Fig. 6 is an enlarged side view of the bolt with certain parts broken away to show a section taken on the line 6—6 of Fig. 5.

Fig. 7 is an enlarged side elevation of the rear portion of the frame with certain parts omitted.

Fig. 8 is an enlarged sectional view taken on the line 8—8 of Fig. 7, but also showing the bolt just prior to reaching its breeched position.

Fig. 9 is a view similar to Fig. 3 but showing the position of the parts after the bolt has reached its breeched position.

In automatic firearms it is usual practice to provide means for preventing doubling of shots, and more particularly it is the practice to provide such means in automatic pistols. However, in certain instances it is desirable to operate the firearm in a fully automatic manner, that is, the gun continues to automatically eject, load, and fire as long as the trigger is held in firing position and the supply of cartridges in the magazine remains unexhausted. I have provided a novel and efficient construction in which the means for preventing doubling of shots may be rendered operative or inoperative as desired so that the firearm may be selectively operated in either a semi or fully automatic manner.

The principles of the invention are adaptable to many types of firearms but for the purpose of this specification I have illustrated an application thereof to an automatic pistol of the type shown in U. S. Patents Nos. 984,519 and 1,070,582. As shown in the drawings forming a part of this specification, the pistol comprises a frame or receiver 1, a barrel 2, a reciprocable slide or breech bolt 3, a firing pin 4, an ejector 5, a grip 6, a trigger 7, and a firing member or hammer 8. In the pistol illustrated the grip is adapted to hold a magazine 9 containing a plurality of cartridges which may be successively fed into the chamber of the barrel, fired, and ejected upon operation of the trigger mechanism and automatic reciprocation of the bolt.

The firing pin is slidably mounted in a hole 10 in the bolt and is biased to retracted position by a spring 11 abutting at one end against a shoulder 12 on the firing pin and at the other end against a portion of the bolt. Rearward movement of the firing pin is limited by a stop 13. It is apparent from the drawings, see Fig. 2, that the firing pin is of such length that when the hammer is in its uncocked position, it may rest against the stop 13 without moving the firing pin sufficiently to cause its forward end to project beyond the front face of the bolt 3. When the gun is intentionally discharged the hammer delivers a blow to the rear end of the firing pin and the momentum of the pin causes it to be projected beyond the front face of the bolt to fire the cartridge primer.

The hammer is pivotally mounted in the frame by a pin 14, and is, through a link 15, biased in a clockwise direction by a main spring (not shown). The body of the hammer is bi-

furcated and has a shoulder 16 formed thereon, and preferably has a safety, or half cock, recess 17 formed therein. For reasons which will be apparent hereinafter, the hammer is also preferably formed with a surface thereon such as shown at 18. The firing mechanism illustrated includes a bifurcated sear 19 pivotally mounted in the frame by a pin 20. The sear is biased in a counter clockwise direction by a sear spring 21 and is adapted to engage with the shoulder 16 on the hammer to hold the same in cocked position.

A trigger bar 22 is secured to the trigger 7 and is slidably mounted in the frame. As shown in Fig. 2, the upper edge of the rear end of the trigger bar is positioned to move in a plane below the edge of the lower end of the sear. In order that retraction of the trigger may serve to move and release the sear, a member is provided which constitutes a connecting means between the trigger bar and the sear. In the illustrated construction a disconnecter 23 normally functions to so connect these elements and, as will be later apparent, it may also serve to prevent doubling of shots. The disconnecter is mounted between the legs of the bifurcated sear on the pin 20 which passes through an aperture 24 in the disconnecter. As this aperture is larger than the pin 20, the disconnecter may pivotally and slidably move relative to the frame and sear. The lower end of the disconnecter is provided with means, such as the laterally projecting wings 25, which are normally adapted to engage with the lower ends of the legs of the sear. A spring 26 presses against a cam surface 27 to urge the disconnecter upward and in a counter clockwise direction, and as the disconnecter presses against the trigger bar, the latter is thereby biased to its non-firing, or forward, position. The top of the disconnecter normally projects above the top of the frame.

As shown in Fig. 2, the lower portion of the disconnecter constitutes a connecting means between the trigger bar and the sear when the disconnecter is in the position shown in this figure. If this lower portion of the disconnecter is moved downwardly from the position of Fig. 2 to that of Fig. 3, the wings 25 will no longer be in a position to engage the sear and consequently the trigger can no longer move the sear to, or hold it in, its hammer releasing position. If such downward movement takes place automatically upon each reciprocation of the bolt the gun will operate in a semi-automatic manner, and conversely, if the sear engaging means on the disconnecter does not move out of alignment with the lower end of the sear following each shot, the sear may be held in its releasing position by the trigger and the gun will operate in a fully automatic manner.

In accordance with the broader aspects of the invention I provide means on the bolt by which the elements of the gun which prevent doubling may be rendered operative or inoperative at the election of the user. When the principles of the invention are applied to a firearm which includes means of the general type illustrated for preventing doubling of shots, the bolt and disconnecter are preferably provided with portions whose positions relative to each other may be adjusted. The adjustability provided is such that the portions may be positioned so as to be engageable upon reciprocation of the bolt to automatically move the disconnecter to a position in which the sear is free from control by

the trigger so that the gun may be operated semi-automatically. The adjustability is also such that the portions may be so relatively positioned that they do not engage upon reciprocation of the bolt so that the gun may be operated fully automatically.

While other constructions involving the principles of the invention may be used, I now consider the form illustrated as the most desirable, particularly for use in a pistol of the type shown. The bolt has a groove 28 formed in the bottom surface thereof into which the top of the disconnecter may project during reciprocation of the bolt (see Fig. 2). In this groove I provide means which may be adjustably positioned to engage or to not engage with the top of the disconnecter as the bolt reciprocates. The now preferred construction of such a means is shown at 29 and comprises a leaf spring member having one end fixed in recesses in the side walls of the groove 28 and having an enlarged camming head 30 formed on the other end. The resiliency of the member 29 tends to move the camming head 30 toward the top of the groove 28. Various means may be provided for moving the camming head to and holding it in a position in which it is adapted to engage and depress the disconnecter upon reciprocation of the bolt. I have shown a camming member 31 which is slidably positioned in a groove 32 in the bolt and which is adapted to cooperate with a laterally projecting lug 33 on the camming head for so moving and holding the latter. The member 31 preferably includes a portion 34 which projects through an opening 35 in the bolt so as to be readily accessible for adjusting the position of the member in the groove 32. The member 31 is slidably held in the bolt by a pin 36 which serves to prevent the forward portion from swinging outward from the bolt, the rear end of the member being held in place as shown in Fig. 5 by the rearward extending portions thereof which are positioned on opposite sides of a portion 37 of the bolt. The member 31 may be removed from the bolt when desired by simply withdrawing the pin 36, springing the forward end of the member outward, and then sliding it forward. The camming member may also be provided with means for holding it in either of its two positions. In the construction illustrated a spring latch 38 is pivotally mounted on the member 31, the forward end of the latch being alternatively engageable in recesses 39 in the bolt to hold the member 31 in either its forward or rearward position. It is apparent that if the camming member 31 is in its rearward position, as shown in Figs. 5 and 6, it will be out of engagement with the lug 33 and thus permit the camming head to lie adjacent the top of the groove 28, and that if it be moved to its forward position it will move the camming head to the position shown in Figs. 2 and 3.

While not strictly essential, an automatic auxiliary sear is preferably provided which will function to hold the firing member in its cocked position until the bolt is in its breeched, or forward, position. I have illustrated one form of construction for an automatic sear, reference being had to Figs. 1, 4, 7, 8, and 9. The surface 18, above pointed out, is provided on the hammer with which an automatic sear 40, pivotally mounted in an aperture 41 in the frame, is adapted to engage when the hammer is rotated to its fully cocked position upon rearward movement of the bolt. The upper end of the sear 40

is positioned in a guide groove 42 in the frame in which a rib 43 on the bolt is adapted to slide. The rib 43 is preferably cut away as shown at 44 to form a relief 45 and a cam surface 46. The automatic sear is biased to its hammer engaging position by a spring 47 positioned between the sear and a sear cover 48. The cover preferably extends under the grip plate 49 into engagement with the boss 50 to be thus held in place. It is apparent that as the bolt reciprocates the lower end of the automatic sear will be moved into and held in engagement with the hammer during such periods as the upper end of the sear may move outwardly into the relief 45. As the bolt moves to its breeched position the upper end of the sear 40 will be cammed inwardly by the cam surface 46 on the bolt to thereby free the hammer from restraint by the automatic sear.

When the principles of the invention are applied to a pistol, the grip is preferably formed so as to permit an auxiliary shoulder stock to be secured to the portion 51 thereof in any desired manner. Such a stock may be advantageously used to help steady the gun when it is being fired fully automatically.

The operation of the pistol as a semi-automatic firearm may be readily understood from Figs. 2 and 3. For operation in this manner the camming member 31 is placed in its forward position so that it holds the camming head 30 in the position shown in these figures, this being accomplished by moving the latch 38 to its forward position of Fig. 1. Assuming that the pistol is cocked, as shown in Fig. 2, with the upper end of the sear 19 engaging the shoulder 16 on the hammer, retraction of the trigger and consequent rearward movement of the trigger bar 22 will rotate the disconnector in a clockwise direction and in so rotating the wings 25 thereon will engage with the lower end of the sear to effect a similar rotation of the sear to release the hammer. After the cartridge has been fired the bolt will automatically move rearward and in so doing the disconnector will be moved downward as the camming head 30 engages with it, and the wings 25 will be moved out of engagement with the sear 19; this action will take place even though the trigger is held in retracted position. At this stage of the operation, shown in Fig. 3, the sear will be free from any control by the trigger and will be biased by the spring 21 to engage with the shoulder 16 on the hammer when the latter has been rotated by the bolt to its fully cocked position. When the bolt moves rearward beyond the position of Fig. 3 the camming head 30 moves out of engagement with the disconnector, but, as the lower end of the sear 19 has already moved to the position of Fig. 3, the disconnector cannot move upward to position the wings 25 in front of the sear until the pressure on the trigger is released to permit counterclockwise rotation of the disconnector. As the bolt reciprocated, the automatic sear 40 was moved into engagement with the hammer and then released from such engagement as the bolt reached its breeched position (see Figs. 8 and 9).

To operate the gun in a fully automatic manner the latch 38 should be moved to its rearward position which serves to move the camming member 31 out of engagement with the camming head 30. This permits the head 30 to move to the top of the groove 28 where it cannot engage and operate the disconnector as the bolt reciprocates. If the gun is cocked and loaded, re-

traction of the trigger will release the sear 19 and permit the hammer to strike the firing pin. After the cartridge has been fired the bolt will move rearwardly but the disconnector will not be operated and consequently the sear 19 remains under the control of the trigger, see Fig. 4. As the bolt moves to its full rearward position it rotates the hammer to cocked position and as it moves forward the hammer will be held cocked by the automatic sear 40. As the bolt reaches its breeched position the cam surface 46 thereon will operate the automatic sear to release the hammer. The hammer will strike a positive blow on the firing pin to fire the cartridge which has been fed into the barrel chamber. This automatic firing will continue as long as the supply of cartridges in the magazine lasts and the trigger is held retracted. The automatic firing may be stopped at any time by simply releasing the pressure on the trigger to permit the sear 19 to operate in the usual manner to hold the hammer cocked.

Alternative forms of the invention will be apparent to those skilled in the art, and I do not mean to limit myself to any particular embodiment except as defined in the claims.

What I claim is:

1. An automatic firearm comprising in combination, a frame, a barrel, a bolt automatically reciprocable upon firing, a firing member, a sear for holding the firing member in cocked position, trigger mechanism, means for preventing doubling of shots, and adjustable means on the bolt affecting the operation of the first-mentioned means for rendering the same operative or inoperative whereby the firearm may be selectively operated in either a semi or fully automatic manner.

2. An automatic firearm comprising in combination, a frame, a barrel, a bolt automatically reciprocable upon firing, a firing member, a sear for holding the firing member in cocked position, trigger mechanism, movable means on the frame for preventing doubling of shots, and means on the bolt movable to and from a position in which said first-mentioned means is automatically actuated thereby upon reciprocation of the bolt whereby the firearm may be selectively operated in either a semi or fully automatic manner.

3. An automatic firearm comprising in combination, a frame, a barrel, a bolt automatically reciprocable upon firing, a firing member, a sear for holding the firing member in cocked position, trigger mechanism, movable means on the frame for preventing doubling of shots, means on the bolt movable to and from a position in which said first-mentioned means is automatically actuated thereby upon reciprocation of the bolt, and readily accessible means on the bolt for adjusting the position of said second-mentioned means whereby the firearm may be selectively operated in either a semi or fully automatic manner.

4. An automatic firearm comprising in combination, a frame, a barrel, a bolt automatically reciprocable from and to breeched position upon firing, a firing member, a sear for normally holding the firing member in cocked position during movement of the bolt to breeched position, trigger mechanism, a disconnector mounted in the frame and normally constituting a connecting means between the trigger mechanism and the sear, said disconnector being normally engageable by the bolt upon reciprocation of the latter to be moved thereby to a position in which it is

- not so positioned as to connect the trigger mechanism and the sear to thereby prevent doubling of shots, and means for rendering the disconnecter inoperative for preventing such doubling of shots by remaining in a position so as to connect the trigger mechanism and sear throughout the reciprocatory movement of the bolt whereby the firearm may be selectively operated in either a semi or fully automatic manner.
5. An automatic firearm comprising in combination, a frame, a barrel, a bolt automatically reciprocable from and to breeched position upon firing, a firing member, a sear for normally holding the firing member in cocked position during movement of the bolt to breeched position, trigger mechanism, a disconnecter mounted in the frame and normally constituting a connecting means between the trigger mechanism and the sear, said disconnecter and bolt each including portions normally so positioned relatively to each other that the disconnecter is engageable by the bolt upon reciprocation of the latter to be moved thereby to a position in which the disconnecter is not so positioned as to connect the trigger mechanism and the sear to thereby prevent doubling of shots, and means for changing the relative positions of the engageable portions of the bolt and disconnecter so as to prevent the engagement of said portions to thereby render the disconnecter inoperative for preventing doubling of shots whereby the firearm may be selectively operated in either a semi or fully automatic manner.
6. An automatic firearm comprising in combination, a frame, a barrel, a bolt automatically reciprocable upon firing, a firing member, a sear for holding the firing member in cocked position, trigger mechanism for releasing the sear, a disconnecter movable in the frame from and to a position in which it constitutes a connecting means between the trigger mechanism and the sear, and adjustable means on the bolt movable to and from a position in which said disconnecter is automatically actuated thereby upon reciprocation of the bolt whereby the firearm may be selectively operated in either a semi or fully automatic manner.
7. An automatic firearm comprising in combination, a frame, a barrel, a bolt automatically reciprocable upon firing, a firing member, a sear for holding the firing member in cocked position, trigger mechanism for releasing the sear, a disconnecter movable in the frame from and to a position in which it constitutes a connecting means between the trigger mechanism and the sear, means on the bolt movable to and from

a position in which said disconnecter is automatically actuated thereby upon reciprocation of the bolt, and readily accessible means for adjusting the position of said means on the bolt whereby the firearm may be selectively operated in either a semi or fully automatic manner.

8. An automatic firearm comprising in combination, a frame, a barrel, a bolt automatically reciprocable upon firing, a firing member, a sear for holding the firing member in cocked position, trigger mechanism for releasing the sear, a disconnecter movable in the frame from and to a position in which it constitutes a connecting means between the trigger mechanism and the sear, means on the bolt movable to and from a position in which said disconnecter is automatically actuated thereby upon reciprocation of the bolt, means for adjusting the position of said means on the bolt whereby the firearm may be selectively operated in either a semi or fully automatic manner, and means for moving said second named means to its adjusting positions and for positively holding it in said positions.

9. An automatic firearm comprising in combination, a frame, a barrel, a bolt automatically reciprocable upon firing, a firing member, a sear engageable with the firing member for holding the same in cocked position, trigger mechanism, means for preventing doubling of shots, means on the bolt for rendering the first-mentioned means operative or inoperative whereby the firearm may be selectively operated in either a semi or fully automatic manner, a second sear for holding the firing member in cocked position, and means for automatically releasing the second sear upon movement of the bolt to breeched position.

10. An automatic firearm comprising in combination, a frame, a barrel, a bolt automatically reciprocable upon firing, a firing member, a sear for holding the firing member in cocked position, trigger mechanism for releasing the sear, a disconnecter movable in the frame from and to a position in which it constitutes a connecting means between the trigger mechanism and the sear, adjustable means on the bolt movable to and from a position in which said disconnecter is automatically actuated thereby upon reciprocation of the bolt whereby the firearm may be selectively operated in either a semi or fully automatic manner, a second sear for holding the firing member in cocked position, and means for automatically releasing the second sear upon movement of the bolt to breeched position.

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