May 3, 1949. W. C. ROEMER 2,469,053

AUTOMATIC SEAR FOR AUTOMATIC AND SEMIAUTOMATIC FIREARMS

Filed March 30, 1945 4 Sheets-Sheet 1

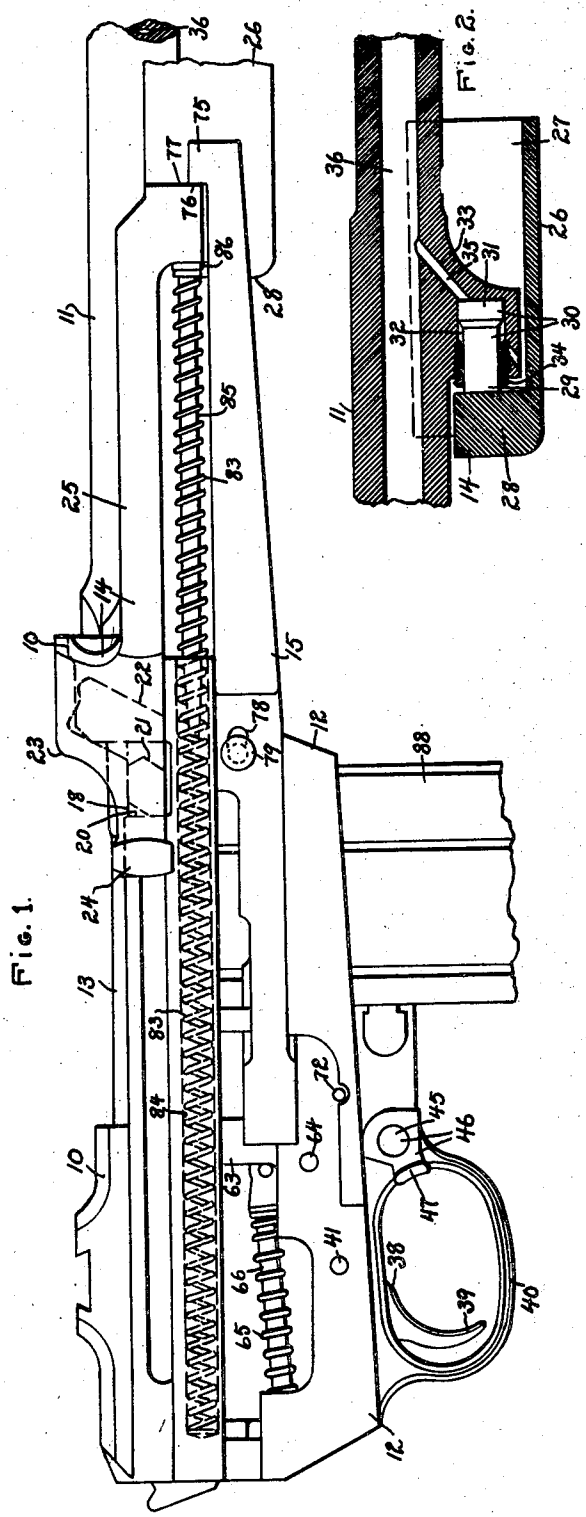


Fig. 1.

Fig. 2.

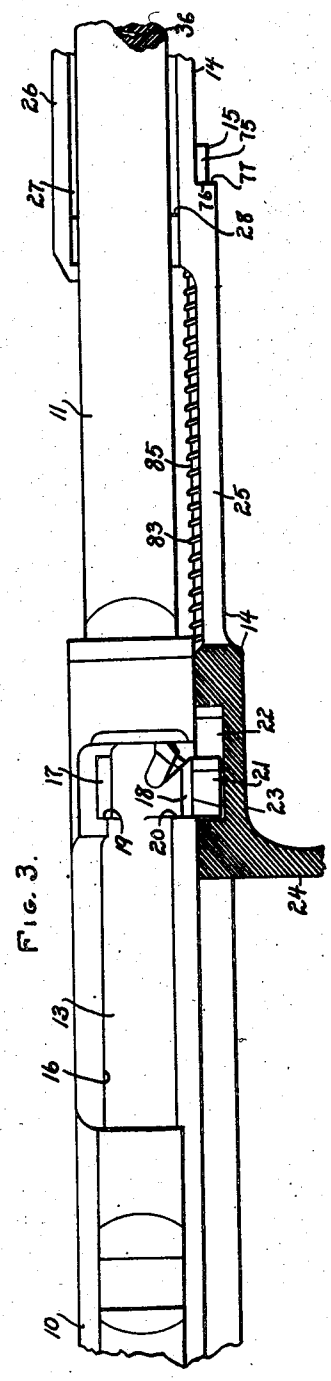


Fig. 3.

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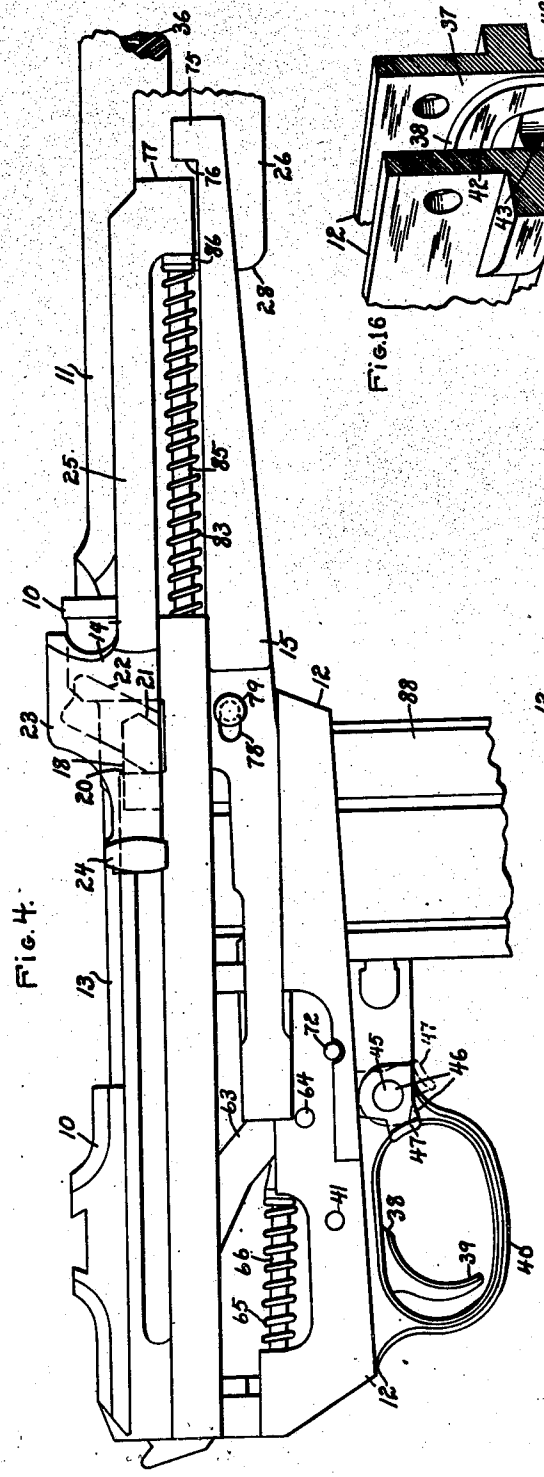


Fig. 4.

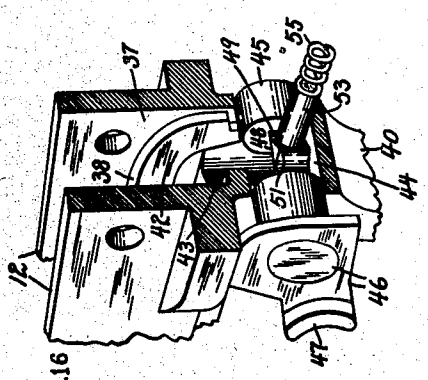


Fig. 16

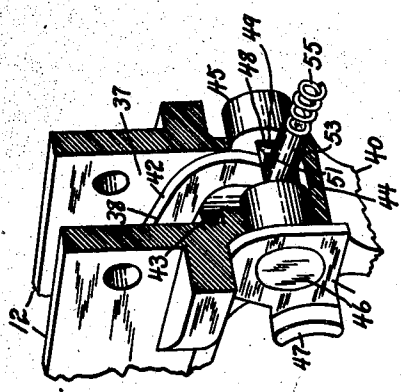


Fig. 15.

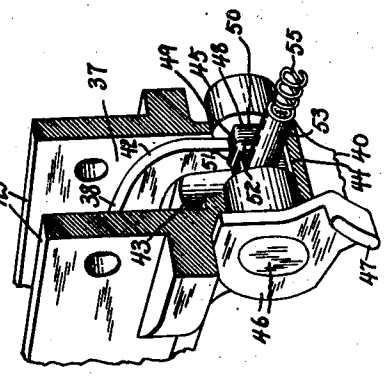


Fig. 14.

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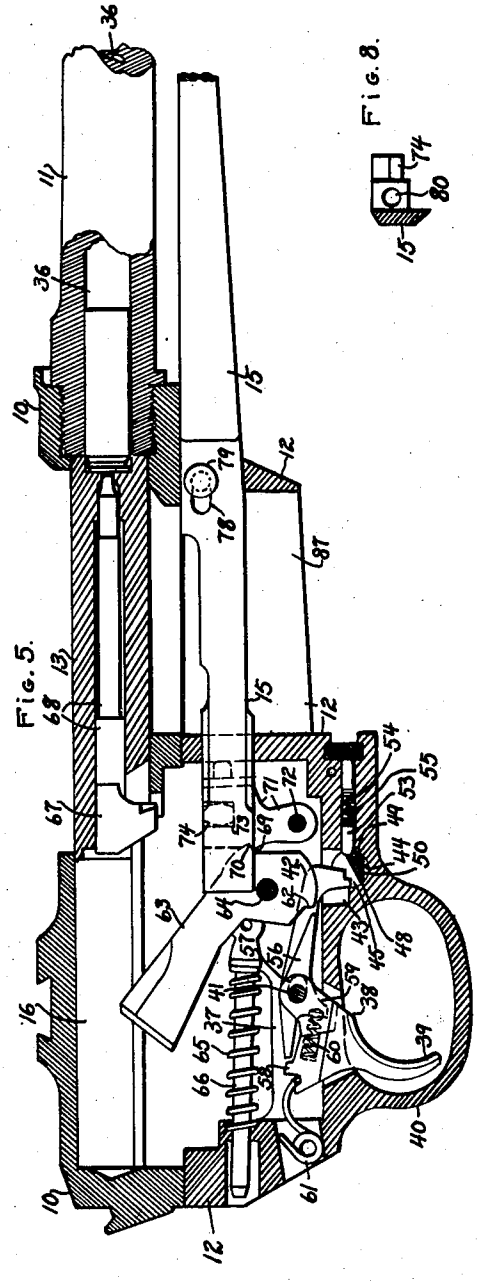


Fig. 5.

Fig. 8.

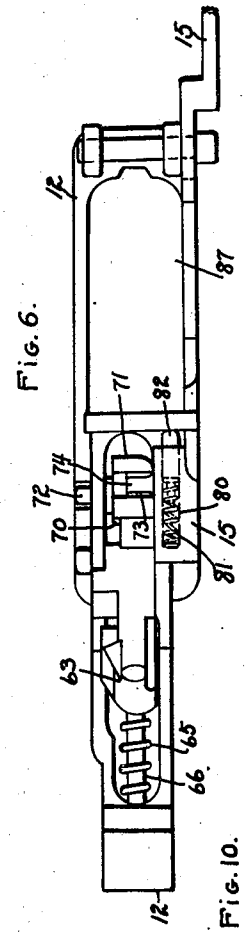


Fig. 6.

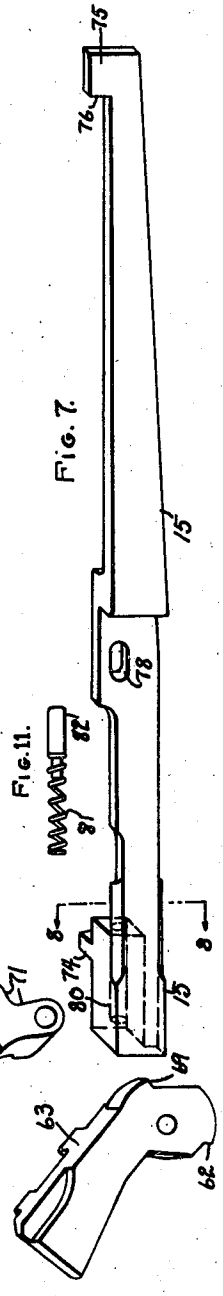


Fig. 7.

Fig. 11.

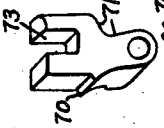


Fig. 10.

Fig. 9.

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AUTOMATIC SEAR FOR AUTOMATIC AND SEMIAUTOMATIC FIREARMS

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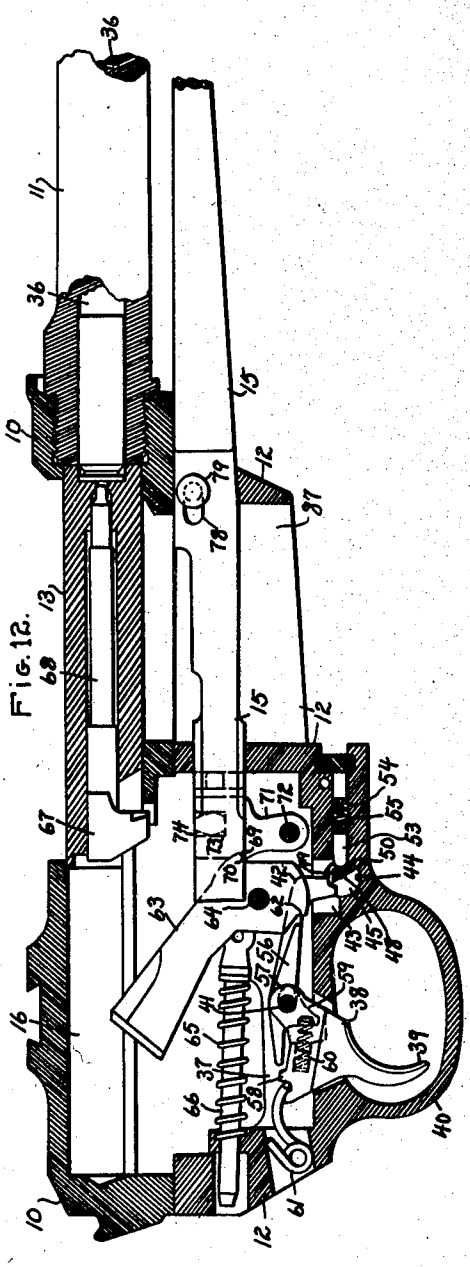


Fig. 12.

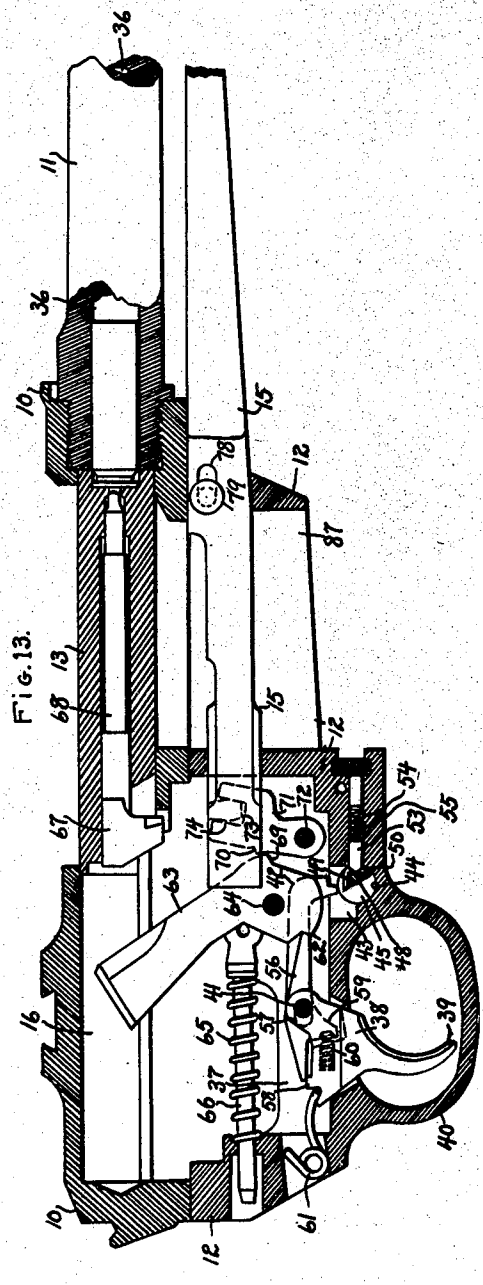


Fig. 13.

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Patented May 3, 1949 2,469,053

UNITED STATES PATENT OFFICE

2,469,053

AUTOMATIC SEAR FOR AUTOMATIC AND SEMIAUTOMATIC FIREARMS

William C. Roemer, New Haven, Conn., assignor to Olin Industries, Inc., New Haven, Conn., a corporation of Delaware

Application March 30, 1945, Serial No. 585,666

1 Claim. (Cl. 89—149)

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The present invention relates to improvements in self-loading firearms and relates more particularly to self-loading firearms of the type which may be selectively utilized as full-automatic or semiautomatic weapons, i. e., weapons which will either automatically reload and repeatedly discharge as long as the trigger is held in a retired position, or which will automatically reload but require the normal operation of the trigger to effect the discharge of each shot.

Broadly speaking, the present invention may be said to constitute an improvement upon the firearm-structure shown and described in the co-pending application of Harry H. Sefried, II, filed August 25, 1944, Serial No. 551,101 and entitled Self-loading firearms.

One of the objects of the present invention is to provide a superior automatic and semi-automatic firearm embodying both a primary-sear and a secondary-sear arranged to cooperate with a hammer or other suitable firing-member and respectively so located with respect thereto as to enable the actuating-means for the secondary-sear to be direct and clear of possible interference with the firing-member.

Another object of the present invention is to provide a superior self-loading firearm of the character referred to and having a primary-sear located mainly rearwardly of a hammer or other suitable firing-member, and a secondary-sear mounted forwardly of the said hammer, together with simple and direct means for actuating the said secondary-sear by means of the action-slide of the firearm.

A further object of the present invention is to provide a simple, reliable and effective mechanism whereby a semiautomatic military firearm of the general type known as the "Carbine MI" may be converted for use also as a full-automatic carbine without requiring extensive modification of the main features of such a firearm.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art and not claimed in my co-pending application Ser. No. 660,184 filed April 6, 1946.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

Fig. 1 is a broken view in side elevation of the receiver, trigger-plate unit, the rear-portion of the barrel and associated elements of a self-loading firearm embodying the present invention, and showing the selector-lever set for full automatic

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fire and showing the trigger held in its "pulled" position, and the hammer and associated parts at the instant of the discharge of the firearm.

Fig. 2 is a broken view in vertical central-longitudinal section of the portion of the barrel and associated features lying at and immediately forward of the portion shown at the right of Fig. 1;

Fig. 3 is a broken top or plan view of the showing of Fig. 1 but with the rear-portion of the action-slide in horizontal section;

Fig. 4 is a view similar to Fig. 1 but showing the hammer as cocked by the secondary-sear and showing the action slide approaching the limit of its forward movement and just prior to its engagement with the sear-actuating bar to effect the automatic discharge of the firearm;

Fig. 5 is a broken view in vertical central-longitudinal section of the firearm-structure with the parts in the same positions in which they are shown in Fig. 4 and with the sear-actuating bar superimposed in the foreground for purposes of illustration and with the box-magazine omitted;

Fig. 6 is a top or plan view of the trigger-plate unit including the rear-portion of the sear-actuating bar, but omitting the box-magazine;

Fig. 7 is a perspective view of the sear-actuating bar, detached;

Fig. 8 is a broken transverse sectional view taken on the line 8—8 of Fig. 7;

Fig. 9 is a perspective view of the hammer, detached;

Fig. 10 is a similar view of the secondary-sear;

Fig. 11 is a view in side elevation of the unit comprising the plunger and spring for yieldingly-holding the sear-actuating bar in its rearmost position;

Fig. 12 is a view similar to Fig. 5 but showing the control-stem of the control-unit turned into position for semiautomatic fire and showing the trigger in its "pulled" position and the hammer temporarily cocked by the secondary-sear;

Fig. 13 is a view similar to Fig. 12 but showing the hammer as released by the secondary-sear and releasably held by the primary-sear preparatory to effecting the discharge of the firearm by a manual rearward draft upon the finger-piece of the trigger which latter is shown in its forward position;

Fig. 14 is a broken perspective view partly in section of the control-unit and associated features together with a portion of the trigger-plate unit, the control-unit being shown in the position which it assumes to enable the firearm to operate semiautomatically;

Fig. 15 is a view similar to Fig. 14 but showing the control-unit turned into position to enable the firearm to operate as a full automatic firearm; and

Fig. 16 is a view similar to Fig. 15 but showing the control-unit moved transversely to render the firearm "safe."

The particular self-loading firearm herein chosen for purposes of illustrating one form of the present invention, includes among its main features a receiver 10, a barrel 11, a trigger-plate unit 12, a breech-bolt 13, an action-slide 14, and a sear-actuating bar 15.

At its forward end the receiver 10 has the rear-end of the barrel 11 secured to it, while the trigger-plate unit 12 is secured in any suitable manner to the under face of the receiver 10 beneath a mechanism-receiving chamber 16 formed in the said receiver and accommodating the breech-bolt 13 in its upper-portion.

The breech-bolt 13 is mounted in the upper-portion of the mechanism-receiving chamber 16 in the receiver 10 in such manner as to be guided for both longitudinal-reciprocation and transverse-oscillation in a manner generally similar to the breech-bolt employed in the well known Garand military rifle. The said breech-bolt is provided adjacent its forward end with two oppositely-extending locking-lugs 17 and 18 formed integral therewith.

The respective rear faces of the locking-lugs 17 and 18 above referred to are adapted to be engaged with and disengaged respectively from forwardly-facing locking-abutments 19 and 20 respectively formed in the opposite side walls of the receiver 10. The right locking-lug 18 is formed with a radially-extending actuating-lug 21 which enters a cam-recess 22 formed in the inner face of the enlarged rear-portion 23 of the action-slide 14, as is especially well shown in Figs. 1, 3 and 4. The said rear-portion 23 of the action-slide 14 has an operating-handle 24 projecting radially outwardly from it, by means of which latter the said action-slide may be manually retired when desired.

The enlarged rear-portion 23 of the action-slide 14 is integrally connected by a bar-portion 25 to a crosshead 26 located at the forward end of the said action-slide. The said crosshead 26 extends beneath the barrel 11 and is formed with an upwardly- and forwardly-opening clearance-recess 27 for purposes as will hereinafter appear.

At its rear the crosshead 26 is provided with an integral rear wall 28 which latter has its forward face normally engaged with the rear end of a stem 29 forming an integral feature of a piston generally designated by the reference character 30.

In addition to its stem 29, the piston 30 above referred to also includes a relatively-large-diametered head 31 and reciprocates within a rearwardly-opening piston-chamber 32. Said piston-chamber 32 is located in a cylinder-lug 33 formed integral with and depending from the barrel 11 at a point slightly forwardly of the front end of the receiver 10 and normally accommodated within the clearance-recess 27 in the crosshead 26 of the action-slide 14.

The rear-portion of the piston-chamber 32 in the cylinder-lug 33 is internally threaded to receive an externally-threaded tubular stop-member 34 through the interior of which latter the stem 29 of the piston 30 extends, as is especially well shown in Fig. 2. Leading forwardly and upwardly from the forward end of the piston-chamber 32 is an inclined gas-passage 35 communicating at its forward upper end with the bore 36 of the barrel 11, to thus permit gas under pressure to impinge against the forward end of the piston 30 to drive the same rearwardly in a manner as will hereinafter appear.

The trigger-plate unit 12 is formed in its rear-portion with an upwardly-opening recess 37 in which is pivotally mounted a trigger 38, as is especially well shown in Figs. 5, 12 and 13. The said trigger 38 is provided with a depending finger-piece 39 which extends within a loop-like trigger-guard 40 forming an integral feature of the lower rear-portion of the trigger-plate unit 12.

The trigger 38 is pivotally connected to the trigger-plate unit 12 within the recess 37 therein, by means of a transverse pivot-pin 41. The said trigger is formed with a forwardly-extending stop-finger 42, the forward end of which is adapted to extend downwardly into an upwardly-opening recess 43, which latter serves to connect the forward lower-portion of the recess 37 and the upper-portion of a transverse passage 44. The said passage 44 extends transversely through the lower part of the trigger-plate unit 12 at a point immediately forwardly of its trigger-guard 40.

The transverse passage 44 above referred to, accommodates, with capacity for both turning and reciprocating movement, the control-stem 45 of a control-unit generally designated by the reference character 46. The said control-unit also includes a plate-like control-lever 47 which is rigidly attached to the right end of the said control-stem 45. The said control-lever is located adjacent the right side of the lower-portion of the trigger-plate unit 12 and is adapted to effect the turning movement of the control-stem 45 through an angle of about 90° for purposes as will hereinafter appear.

About midway of its length the control-stem 45 of the control-unit 46 is cut away to provide a relatively-slender web 48 of substantially-triangular form in cross section, as is especially well shown in Figs. 5, 12 and 13. The said web has a relatively-short face 49 and a relatively-long face 50 extending at a substantial right angle to the face 49 just referred to. The relatively-short face 49 of the control-stem 45 is formed about midway of its length with a transverse detent-rib 51, and similarly the relatively-long face 50 is also formed with a detent-rib 52 forming in effect a continuation of the detent-rib 51 but extending at a right angle thereto.

Adapted to coact selectively with either of the two faces 49 and 50 of the control-stem 45 as well as with the respective detent-ribs 51 and 52 thereof, is a detent-plunger 53. The said detent-plunger is mounted for reciprocation substantially lengthwise of the firearm-structure in a substantially-horizontal socket 54 formed in the lower-portion of the trigger-plate unit 12 immediately forwardly of the trigger-guard 40 thereof, as is especially well shown in Figs. 5, 12 and 13. Engaged with and thrusting rearwardly upon the detent-plunger 53, is a helical detent-spring 55 located in the forward-portion of the socket 54.

Pivotally mounted upon the pivot-pin 41 serving as a mount for the trigger 38, is a lever-like primary-sear 56 having a transverse slot 57 located about midway of its length and through which the said pivot-pin 41 extends. The slot 57 is designed and adapted to not only permit the

said primary-sear 56 to pivot about the pivot-pin 41 but also to permit the said primary-sear to have limited lengthwise bodily movement with respect to the said pivot-pin and the trigger 38.

The rear end of the primary-sear 56 is adapted on occasion to engage with the forward face of a transverse stop-rib 58 formed on the upper rear-portion of the trigger 38. About midway of its length, the primary-sear 56 is formed with a depending-lug 59, against the rear face of which presses the forward end of a helical sear-spring 60 which is carried in the upper-portion of the trigger 38. The said sear-spring 60 exerts a constant-but-yielding effort to turn the primary-sear 56 in a counterclockwise direction (as viewed from the right) so as to lift its forward end, and also exerts a yielding effort to bodily move the said primary-sear forwardly to the limit of the movement permitted by its transverse slot 57 and the pivot-pin 41.

The trigger 38 and the parts carried thereby are yieldingly urged to turn in a counterclockwise direction by a trigger-spring 61 carried in the rear-portion of the trigger-plate unit 12 and pressing downwardly upon the upper rear-portion of the trigger 38, as is shown in Figs. 5, 12 and 13.

The foward end of the primary-sear 56 is adapted to releasably engage with a rearwardly-facing primary-cocking abutment 62 formed upon the lower-portion of a pivotal-hammer 63. The lower-portion of the said hammer extends into the upwardly-opening-recess 37 in the trigger-plate unit 12 and is pivotally mounted therein upon a transverse hammer-pin 64. The said hammer 63 is urged to swing in a clockwise direction by a helical hammer-spring 65 which acts through the intermediary of a plunger 66 extending through the said hammer-spring 65 and thrusting at its forward end against the hammer 63.

The upper forward end of the hammer 63 is adapted to strike the head 67 of a firing-plunger 68 which is mounted for reciprocation in the breech-bolt 13 and is designed to effect the discharge of the firearm in a manner well known in the art.

On its forward edge the hammer 63 is formed with a downwardly-facing secondary-cocking abutment 69 which is adapted to be engaged by an upwardly-facing secondary-cocking abutment 70 formed on the rear edge of a substantially-vertical secondary-sear 71.

The secondary-sear 71 above referred to is accommodated in the forward-portion of the recess 37 in the trigger-plate unit 12 and is mounted at its lower end for pivotal movement upon a transverse pivot-pin 72. The said secondary-sear is formed in its upper end with an upwardly-and-laterally-opening coupling-notch 73 which receives a coupling-finger 74 formed integral with and projects inwardly from the rear-portion of the sear-actuating bar 15 before referred to. The rear-portion of the said sear-actuating bar extends along one side of the forward-portion of the trigger-plate unit 12, and at its forward end projects into a position adjacent the cylinder-lug 33 on the barrel 11. At its forward end, the said sear-actuating bar 15 is formed with an upwardly-extending finger 75, the substantially-vertical rear face of which constitutes a tripping-abutment 76. The rearwardly-facing tripping-abutment 76 just referred to is adapted to be engaged by a forwardly-facing tripping-abutment 77 formed on the action-slide 14 at the

junction of its bar-portion 25 and its crosshead 26, as is especially well shown in Figs. 1, 3 and 4.

About midway of its length the sear-actuating bar 15 is formed with a transverse and longitudinal slot 78 through which extends a transverse coupling-pin 79 supported in the firearm-structure. The said slot 78 permits limited lengthwise movement of the sear-actuating bar 15 relative to the coupling-pin 79 and relative to the receiver 10, barrel 11, trigger-plate unit 12 and associated parts.

For the purpose of yieldingly holding the sear-actuating bar 15 at the limit of its rearward movement, the said bar is formed in its rear adjacent its coupling-finger 74, with a forwardly-opening spring-pocket 80 in which is located a helical spring 81 and the rear-portion of a plunger 82. The forward end of the said plunger bears against the adjacent portion of the trigger-plate unit 12, as is shown particularly well in Fig. 6.

The action-slide 14 is yieldingly urged forwardly by a helical breech-closing spring 83 having its rear end seated in a spring-pocket 84 extending longitudinally of and opening forwardly through the right side wall of the receiver 10, as is shown in Fig. 1. The forward portion of the said breech-closing spring 83 encircles a breech-closing plunger 85 and thrusts the same forwardly by abutting against the rear face of an integral annular-collar 86 formed adjacent the forward end of the said plunger. The forward face of the collar 86 just referred to bears against the adjacent rear-portion of the cross-head 26 of the action-slide 14.

The forward portion of the trigger-plate unit 12 is formed with a vertical magazine-receiving passage 87 which is adapted to receive a box magazine 88 of a type common in repeating firearms.

The full automatic functioning of the firearm

For purposes of making clear the operation of the gas-operated firearm herein chosen for purposes of illustration, let it be assumed that the control-unit 46 is at the limit of it movement from right to left and is turned into the position in which it is shown by full lines in Figs. 1, 4, 5, 15 and 16. When the control-unit 46 is in the position just referred to its control-stem 45 will be in a position of noninterference with the stop-finger 42 of the trigger 38, as is especially well shown in Fig. 5. It may further be assumed that the trigger 38 is held in its "pulled" position and that the firearm has just been discharged so that the parts assume the position in which they are shown in Figs. 1 and 3.

Under the conditions just above described, gas under pressure created in the bore 36 of the barrel 11 by the just-fired cartridge, will pass downwardly through the inclined gas-passage 35 into the forward-portion of the piston-chamber 32 in the cylinder-lug 33 and will impinge against the forward face of the head 31 of the piston 30.

The impingement just above referred to will drive the piston 30 rearwardly until the rear face of its head 31 engages with and is stopped by the forward face of the ring-like stop-member 34. During the relatively-short rearward travel of the piston 30 as just described, the stem 29 thereof will, through the intermediary of the rear-wall 28 of the crosshead 26, drive the action-slide 14 rearwardly to a much greater extent.

The initial rearward movement of the action-slide 14 under the urge of the piston 30, will cause

the surfaces of the cam-recess 22 in the action-slide to coact with the actuating-lug 21 of the breech-bolt 13 to turn the said breech-bolt in a clockwise direction (as viewed from the front). This turning movement of the breech-bolt will disengage the locking-lugs 17 and 18 respectively from the locking-abutments 19 and 20 of the receiver 10, to thus unlock the said breech-bolt for direct rearward travel.

Follbwing the unlocking movement of the breech-bolt 13 as above described, the continued rearward movement of the action-slide 14 will move the said breech-bolt directly rearwardly to the limit of its rearward travel. The described rearward movement of the action-slide 14 will, of course, be accomplished against the tension of the breech-closing spring 83.

As the breech-bolt 13 is moved rearwardly as above described, it will engage with and override the upper-portion of the hammer 63, to thereby swing the same in a counterclockwise direction (as viewed from the right) into an overcocked position slightly beyond the position in which the said hammer is shown in Fig. 5. This described movement of the hammer 63 will bring the secondary-cocking abutment 69 thereof to a position above the secondary-cocking abutment 70 of the secondary-sear 71. In this connection, it is to be noted that as the action-slide 14 moves rearwardly as above described, the tripping-abutment 77 thereof will ride clear of the tripping-abutment 76 at the forward end of the sear-actuating bar 15 to thus permit the said sear-actuating bar to be moved bodily rearwardly by the spring 81 to the limit of the movement permitted by the slot 78 and the coupling-pin 79, i. e., into the position in which the said sear-actuating bar 15 is shown in Fig. 5.

After the breech-bolt 13 has reached the limit of its rearward travel, the breech-closing spring 83 acting through the action-slide 14, will assert itself to move the said breech-bolt forwardly. A short forward travel of the said breech-bolt from its rearmost position will cause the same to move out of engagement with the hammer 63 and thus permit the said hammer to turn slightly in a clockwise direction until the secondary-cocking abutment 69 thereof engages with the secondary-cocking abutment 70 on the secondary-sear 71, which latter is now at the limit of its rearward swing. Here again it is to be borne in mind that the trigger 38 is still held in its "pulled" position, as normally would be the case when the marksman is operating the firearm as a full automatic firearm.

After the breech-bolt 13 has moved forwardly sufficiently to permit the hammer 63 to swing in a clockwise direction and thus engage the secondary-cocking abutments 69 and 70, the forward movement of the said breech-bolt will continue under the urge of the breech-closing spring 83 and the action-slide 14, until the respective rear faces of the locking-lugs 17 and 18 of the said breech-bolt are brought into registration with the locking-abutments 19 and 20 of the receiver 10. As soon as the registration just referred to takes place, the contours of the cam-recess 22 in the rear-portion 23 of the action-slide 14 will turn the said breech-bolt in a counterclosewise direction, to thus lock the said breech-bolt against rearward movement so that the parts referred to will have assumed substantially the positions in which they are shown in Fig. 4.

After the parts have reached the position in which they are shown in Fig. 4, the action-slide 14 will continue its forward movement until it reaches the position in which it is shown in Fig. 1. During this latter movement, the tripping-abutment 77 of the action-slide will engage with the tripping-abutment 76 at the front of the sear-actuating bar 15, to thus move the said bar forwardly. The described forward movement of the sear-actuating bar 15 will cause the said bar to act through the intermediary of its coupling-finger 74 and the coupling-notch 73 in the secondary-sear 71 to rock the said secondary-sear forwardly. The described rocking movement of the secondary-sear 71 will swing the secondary-cocking abutment 70 thereof out from under the secondary-cocking abutment 69 of the hammer 63, thus releasing the said hammer to again effect the discharge of the firearm and to repeat the cycle before described.

It is to be noted that the secondary-sear 71 is not turned sufficiently to release the hammer 63 until after the action-slide 14 has effected the locking of the breech-bolt 13.

Should it be desired to lock the trigger 38 in a "safe" position, to thereby prevent the discharge of the firearm while the control-unit 46 is turned into position for full automatic fire as is shown in Figs. 1, 4, 5 and 15, the said control-unit 46 may be shifted from left to right along the axis of the control-stem 45, from the position in which it is shown in Fig. 15 into the position in which it is shown in Fig. 16. This shifting may be effected by manually pressing on the left end of the control-stem 45.

The described shifting of the control-unit 46 will, or course, be done while the trigger 38 is in its released position, in which position the stop-finger 42 of the said trigger is lifted. The shifting of the control-unit will cause the detent-rib 51 on the short face 49 of the web 48, to cam the detent-plunger 53 forwardly against the tension of the detent spring 55. Ultimately, in the travel of the control-stem 45 from left to right, the rear end of the detent-plunger 53 will ride down the left side of the detent-rib 51 and yieldingly hold the control-unit 46 in this "safe" position.

When the control-unit 46 is shifted as just above described, it will bring the full diameter of the left end of the cylindrical control-stem 48, beneath the stop-finger 42 of the trigger 38 and thereby prevent the said trigger from being "pulled" sufficiently to release the hammer 63.

The semiautomatic functioning of the firearm

When it is desired to so adjust the firearm that it will automatically reload but will require the release and subsequent pull of the trigger for each discharge, the control-lever 47 may be turned into the position in which it is indicated by broken lines in Fig. 4 and by full lines in Fig. 14, to thus turn the control-stem 45 into the position in which it is shown in Figs. 12, 13 and 14. The described turning movement of the control-unit 46 will of course, be effected while the same is in its "non-safe" position, i. e., it is shifted from right to left so that the trigger 38 may be pulled. Under these conditions the detent-plunger 53 will lie to the right of the detent-rib 52 on the long face 50 of the web 48, as shown in Fig. 14.

It will be noted by reference to Figs. 12, 13 and 14 that when the control-unit 46 is turned as described, it is in a position whereby the short face 49 of its web 48 will be up and in a position to be engaged by the stop-finger 42 of the trigger 38 after the said trigger has been turned in a

clockwise direction but a relatively-short distance, but before the said trigger can be fully turned into the position in which it is shown in Fig. 5.

For purposes of description let it be assumed that the parts are in substantially the positions in which they are shown in Fig. 12, in which it will be noted the trigger **38** is held in its "pulled" position and the hammer **63** is held in its cocked position by the secondary-sear **71**. In the figure last referred to, the breech-bolt **13** is in its breech-closing position but the action-slide **14** will be in the position shown in Fig. 4, and has not as yet moved into its full forward position to cause the sear-actuating bar **15** to be moved forwardly sufficiently to turn the said secondary-sear into its hammer-releasing position.

The conditions illustrated in Fig. 12 may be assumed to have occurred immediately after the discharge of the firearm but before the marksman has had an opportunity to release the trigger **38** and before the action-slide has moved the sear-actuating bar **15** forwardly to release the hammer **63**, though the breech-bolt **13** has been locked at breech-closing position as before referred to and much in the manner illustrated in Fig. 4.

The continued forward movement of the action-slide **14** from the position in which it is shown in Fig. 4 into the position in which it is shown in Figs. 1 and 3 (under the condition prevailing, however, in Fig. 12), will cause the tripping-abutment **77** of the said action-slide to engage with the rearwardly-facing tripping-abutment **76** at the forward end of the sear-actuating bar **15**, so as to bodily move the said bar forwardly against the tension of the spring **81**.

The described forward movement of the sear-actuating bar **15** will cause the same to act through the intermediary of its coupling-finger **74** and the coupling-notch **73** in the secondary-sear **71**, to turn the said secondary-sear about its pivot-pin **72** and move the secondary-cocking abutment **70** forwardly out of engagement with the secondary-cocking abutment **69** on the hammer **63**. This latter movement will release the hammer **63** to the action of the hammer-spring **65**.

The described release of the hammer **63** will permit the said hammer to swing but a short distance under the conditions here prevailing, since the forward end of the primary-sear **56** will be in position to be engaged by the primary-cocking abutment **62** of the said hammer. The engagement just referred to will now occur and will force the primary-sear **56** to move bodily a slight distance rearwardly against the tension of the sear-spring **60**. This rearward bodily movement will only continue until the rear end of the said primary-sear engages with the forward face of the stop-rib **58** at the rear of the trigger **38**, since the said trigger is, under the circumstances, still being held in its "pulled" position.

Now in the normal operation of the firearm, the marksman will in due course release the trigger **38** and permit the same to turn into the position in which it is shown in Fig. 13, whereupon the stop-rib **58** at the rear of the said trigger will be lowered. This lowering of the stop-rib **58** will permit the hammer **63** to force the primary-sear **56** further rearwardly against the tension of the sear-spring **60**, until the forward wall of its transverse slot **57** engages with the forward-portion of the pivot-pin **41**, as is shown in Fig. 13. During the rearward travel of the primary-sear as just described, its rear-portion will move into a position overlying the upper surface of the stop-rib **58** of the trigger **38**.

The parts will now have assumed the positions in which they are shown in Fig. 13, in which figure, it will be noted, the secondary-sear **71** is swung forwardly out of action and the hammer **63** is held in its cocked position by the primary-sear **56** in readiness for the discharge of the firearm when the trigger **38** is again pulled.

When the trigger **38** is again pulled it will act through its stop-rib **58** to turn the primary-sear **56** in a clockwise direction and thus disengage the forward end of the said primary-sear from the primary-cocking abutment **62** of the hammer **63**. The described action will cause the discharge of the firearm and the repetition of the cycle of semiautomatic operation above described.

Should it be desired to render the firearm "safe" while the control-unit **46** is turned into position to cause the firearm to operate as a semi-automatic weapon, the said control-unit may be manually shifted from left to right in a manner similar to the shifting of the said unit from the position in which it is shown in Fig. 15 into the position in which it is shown in Fig. 16.

The shifting of the control-unit **46** from left to right as above described, will cause the detent-rib **52** on the long face **50** of the web **48**, to cam the detent-plunger **53** forwardly until such time as the said web has moved sufficiently to the right to permit the said detent-plunger to ride down the left side of the said detent-rib **52** and into engagement with the portion of the long face **50** lying to the left of the detent-rib **52**.

The full-diametered portion of the control-stem **45** of the control-unit **46** is more remote from the center of oscillation of the control-stem than is the short-face **49** thereof. The full diameter of the said control-stem may, therefore, be viewed as providing a safety-stop surface, inasmuch as it serves to check the movement of the trigger **38** before the same can effect the discharge of the firearm regardless of whether the said control-stem is turned into either full-automatic setting or semi-automatic setting. The short-face **49** may be properly designated as providing a semi-automatic-stop surface, inasmuch as it serves to limit the swinging movement of the trigger to just the amount required to cause the firearm to function as a semi-automatic firearm. The cutaway-portion of the control-stem **45** which is adjacent the back of the long-face **50**, may be appropriately designated as a "full-automatic clearance-portion," inasmuch as it serves (when in the position shown in Fig. 5) to permit the trigger **38** to be pulled far enough to effect the full-automatic operation of the firearm.

From the foregoing it will be seen that the detent-plunger **53** serves to yieldingly hold the control-unit in any one of four different positions, i. e., automatic, semiautomatic, automatic-safe and semiautomatic-safe positions.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claim are intended to be embraced therein.

I claim:

An automatic and semiautomatic firearm-

structure including in combination: a receiver; a breech-bolt movable in the said receiver; a bolt-operating slide mounted for reciprocation adjacent the said receiver and operatively connected to the said breech-bolt for moving the same, the said bolt-operating slide being provided with a forwardly-facing tripping-abutment; a pivotal hammer provided with a primary-cocking abutment and a secondary-cocking abutment; a primary-sear located mainly to the rear of the said pivotal hammer and engageable with the primary-cocking abutment thereof to releasably hold the hammer in a cocked position; a trigger operatively connected to the said primary-sear for actuating the same; a substantially-vertical pivotal secondary-sear located mainly forwardly of the said pivotal hammer and pivoted to the firearm-structure adjacent its lower end, the said pivotal secondary-sear being formed above its pivot-point with a secondary-cocking abutment engageable with the secondary-cocking abutment of the said hammer to releasably restrain the latter; a reciprocating sear-actuating member movable substantially lengthwise of the said receiver and independently formed from the said secondary-sear, the said reciprocating sear-actuating member being operatively connected at its rear-portion to the said pivotal secondary-sear for positively swinging the same both forwardly and rearwardly, and the said reciprocating sear-actuating member also being provided adjacent its forward end with a rearwardly-facing tripping-abutment positioned to be engaged by the forwardly-facing tripping-abutment of the said bolt-operating slide to forwardly shift the sear-actuating member and cause the same to swing the said independently-formed pivotal secondary-sear to disengage the secondary-cocking abutment of the latter from the secondary-cocking abutment of the said hammer, the said sear-actuating member being formed intermediate its ends with a forwardly-opening spring-receiving pocket and located outwardly of the secondary-sear; and a helical spring mounted in the spring-receiving pocket of the sear-actuating member and yieldingly thrusting both the sear-actuating member and the secondary-sear rearwardly.

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