

July 12, 1949.

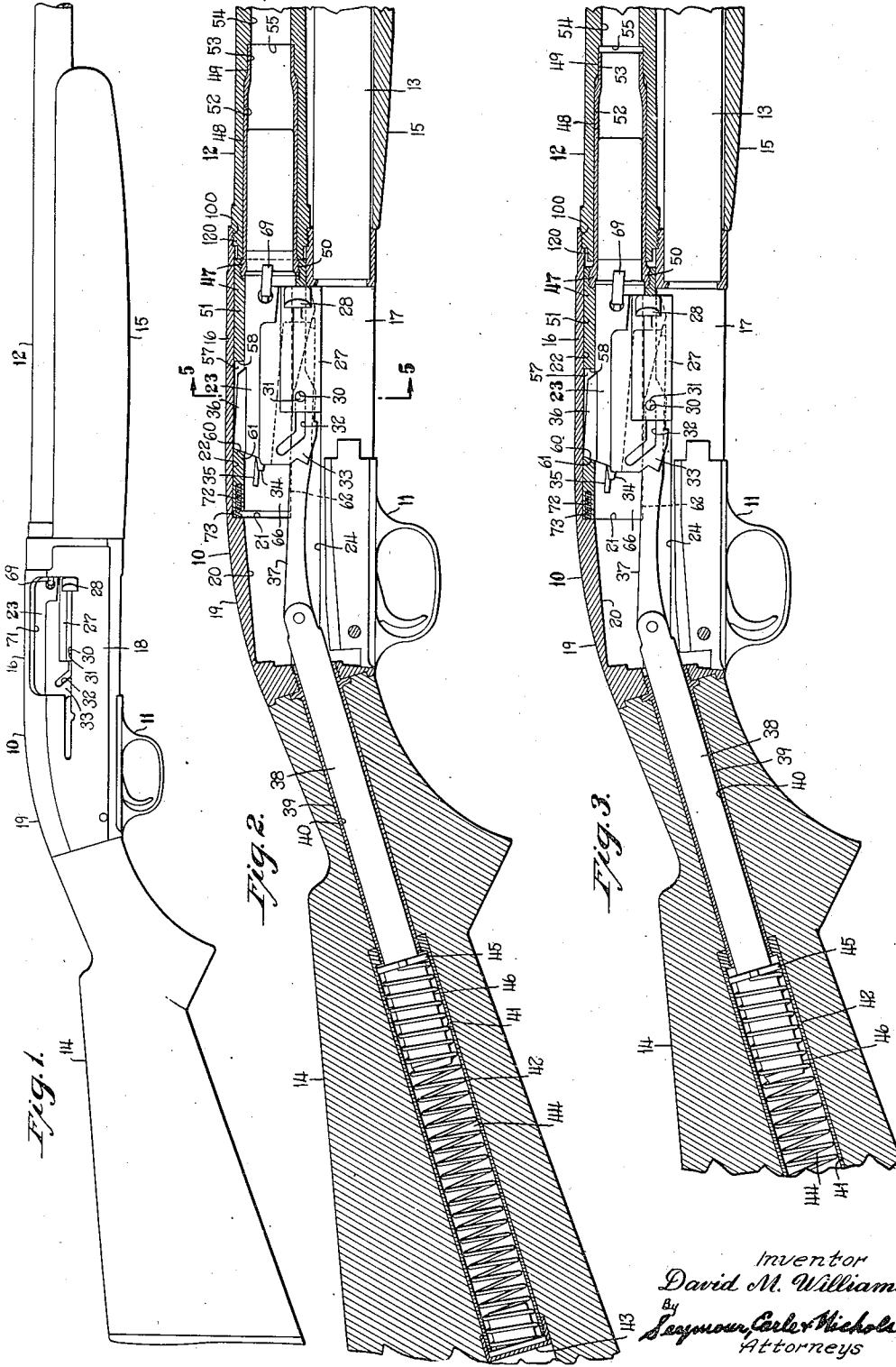
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2,476,232

INERTIA OPERATED BOLT LOCK

Filed Nov. 6, 1947

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

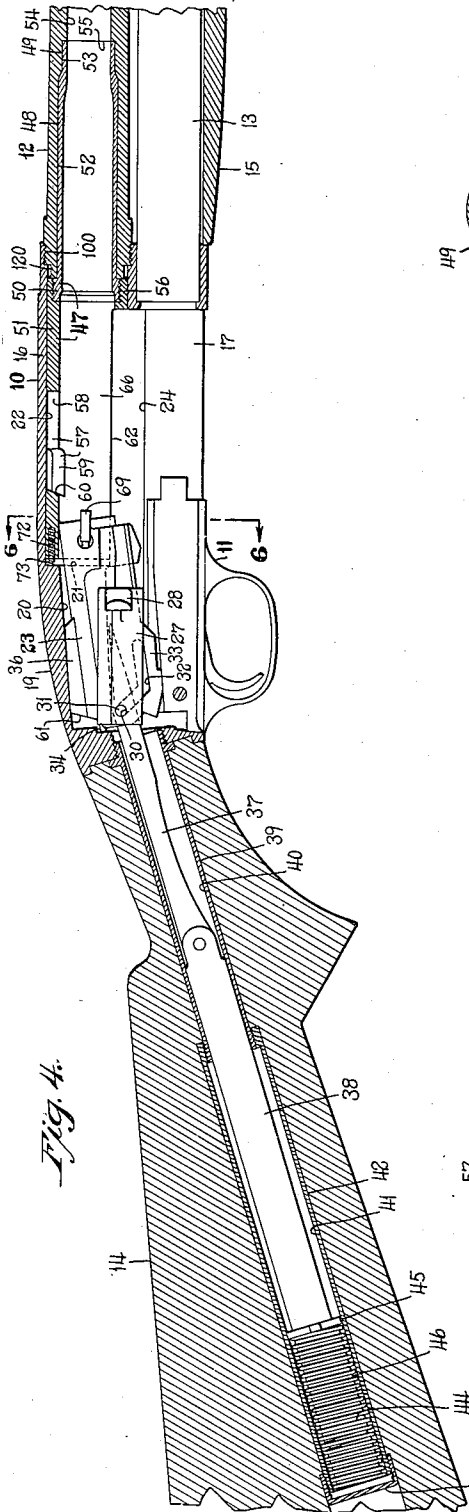


Fig. 4.

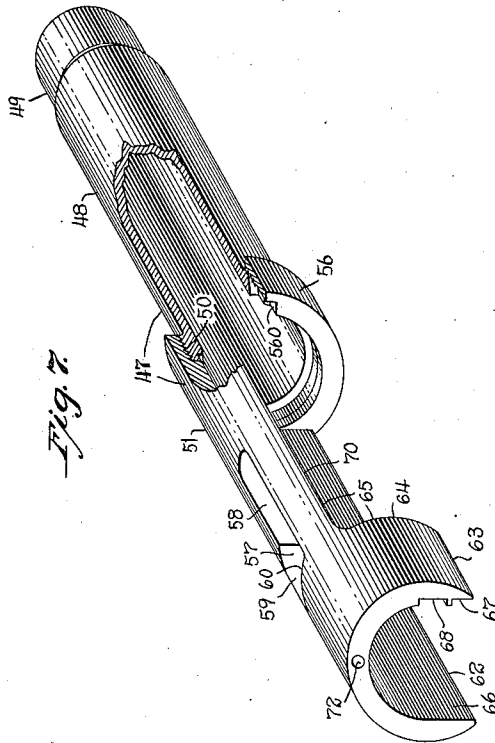


Fig. 5.

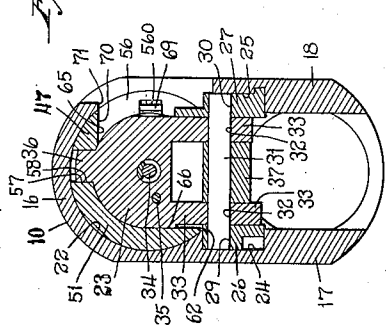


Fig. 6.

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3 Sheets-Sheet 3

Fig. 9.

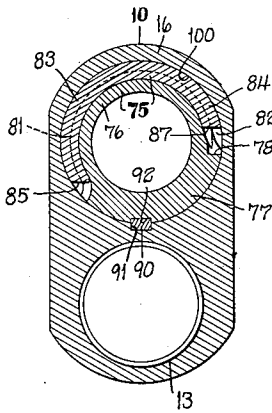


Fig. 8.

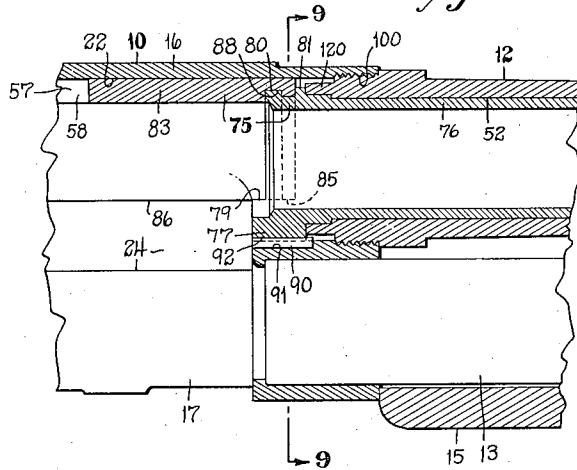


Fig. 6.

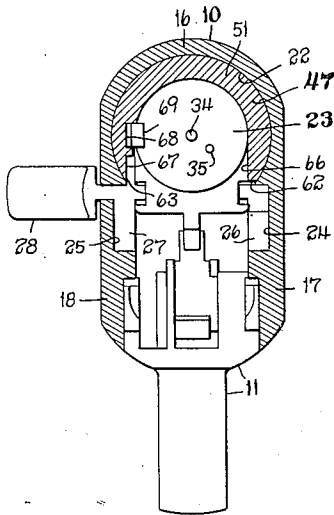


Fig. 10.

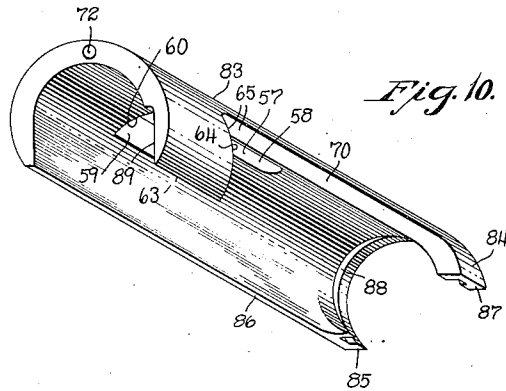
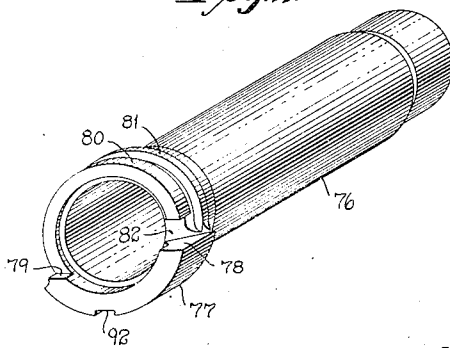


Fig. 11.



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UNITED STATES PATENT OFFICE

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INERTIA OPERATED BOLT LOCK

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Application November 6, 1947, Serial No. 784,360

20 Claims. (Cl. 89-182)

1

The present invention relates in general to firearms and more especially to an automatic firearm of the type embodying a fixed barrel, a breechblock and a chamber-unit, the latter being movable rearwardly with respect to said barrel on discharge of said firearm to initiate the rearward excursion of the breechblock.

An object of the invention is to provide an improved automatic firearm having a fixed barrel and embodying a rearwardly-moving breechblock and a chamber-unit, these elements being cooperatively arranged so as to permit the use of a streamlined profile at the rear end of the receiver.

A further object of the invention is to provide an improved automatic firearm of the class described wherein the forces of the initial and secondary recoils are minimized by utilizing a chamber-unit which moves only a very small fraction of the total distance moved by the breechblock during its rearward excursion.

A still further object of the invention is to provide an automatic firearm of the class described with a superior breechblock and chamber-unit assembly for securing maximum efficiency in the use of the propelling force of the gases of explosion before opening the breech.

A still further object is to provide the rearwardly-movable chamber-unit of an automatic firearm with resilient-means independent of a recoil-spring for returning the unit from its rearward position in the receiver to its normal forward position therein, following the discharge of the 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 which are not claimed in any separate application.

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

Fig. 1 is a broken side elevation of an automatic firearm having a fixed barrel, a streamlined receiver and the improved breechblock and chamber-unit assembly of this invention.

Fig. 2 is an enlarged broken side elevation in section of the firearm shown in Fig. 1, the breechblock and chamber-unit being in their normal forward positions preparatory to firing the cartridge in the chamber.

Fig. 3 is a similar side elevation of the firearm of Fig. 2 but showing the relative positions of the breechblock and the chamber-unit immediately following the discharge of the cartridge in the chamber.

Fig. 4 is a side elevation of the firearm similar to Figs. 2 and 3, but with the breechblock at or substantially at the end of its rearward excursion

2

in the receiver and the chamber-unit in its normal forward position in the receiver;

Fig. 5 is a sectional end elevation of the firearm on line 5-5 of Fig. 2;

Fig. 6 is a sectional end elevation of the firearm on line 6-6 of Fig. 4;

Fig. 7 is a perspective view partly in section of the improved chamber-unit of this invention.

Fig. 8 is a broken side elevation in section of the firearm, showing details of a modification of the chamber-unit;

Fig. 9 is an end elevation in section on line 9-9 of Fig. 8;

Fig. 10 is a perspective view of the chamber-extension of the modified chamber-unit shown in Figs. 8 and 9; and

Fig. 11 is a perspective view of the chamber-member of the modified chamber-unit.

For the purpose of illustrating the present invention, the latter is shown and described as an embodiment of an automatic firearm of the type having a fixed barrel, a reciprocable breechblock and a chamber-unit which is reciprocally mounted in the receiver and barrel of the firearm for movement relative to the fixed barrel. Referring to Fig. 1, the automatic firearm comprises, in the main, a receiver 10, a trigger-plate 11 adapted to be demountably secured in any conventional manner to the underside of the receiver, a barrel 12, the breech-end 120 of which is threadedly or otherwise fixedly secured in an aperture 100 in the front wall of the receiver, a tubular magazine 13 secured at its rear end in an aperture in the front wall of the receiver, and a buttstock 14 secured to the rear end of the receiver. The firearm is also shown provided with a fore end 15 which is suitably secured to the receiver-barrel-and-magazine assembly.

The receiver 10 of the firearm comprises a top wall 16 and spaced parallel side walls 17 and 18, the latter cooperating with the top wall to form an inverted substantially-U-shaped member having a chamber for accommodating the breechblock, chamber-unit and fire-control mechanism of the firearm. The top wall 16 of the receiver is characterized by a rearwardly-and-downwardly-sloping surface 19 adjacent the rear end thereof, which provides a smooth streamlined profile pleasing to the eye and which is hereinafter referred to as the "streamlined" top wall of the receiver. The underside 20 of the top wall 16 of the receiver is adapted to be provided with a transverse substantially-square shoulder 21 which is located at a predetermined distance rearwardly of the breech-end of the barrel, which shoulder is formed by milling or otherwise forming a relief-recess 22 in the underside 20 of the top wall 16, the relief-recess being an extension of the aperture 100 in the front wall of the receiver and substantially concentric with the curvature of

3

the top wall thereof. It will be understood, however, that the shoulder 21 may be formed by welding or otherwise securing a separate member at the rear end of a relief-recess extending through out the length of the top wall of the receiver.

A breechblock indicated generally at 23, is adapted to be supported in the receiver for both longitudinal and pivotal movement and to this end the inside faces of the respective side walls 17 and 18 of the receiver 10 are provided with longitudinal grooves 24 and 25 respectively, each of which is substantially rectangular in cross section and adapted to slidably support a guide-member 26 and 27 respectively. The guide-member 26 comprises a bar substantially rectangular in cross section and arranged to engage in a longitudinal groove (not shown) of corresponding cross section formed in the forward end of the breechblock, whereas the guide-member 27 constitutes the body-portion of the finger-piece 28 which is used for manually retracting the breechblock, the guide-member 27 being adapted also to engage in a longitudinal groove (not shown) of corresponding cross section formed in the forward end of the breechblock. The rear end of each guide-member is provided with a transverse aperture 29 and 30 respectively, each being adapted to be arranged in axial alignment and to accommodate the respective opposite ends of a transverse pivot-pin 31. The latter is provided for connecting the rear ends of the guide-members to the breechblock and to this end is adapted to pass transversely through suitable rocker-shaped cam-slots 32 formed in the opposite depending spaced parallel sides 33 of the breechblock, the guide-members 26 and 27 being pivotally secured thereto on the outer faces of the respective sides 33 of the breechblock, as clearly shown in Fig. 5. When the breechblock is locked in breech-closing position as shown in Figs. 2 and 3, the transverse pivot-pin 31 of the guide-members 26 and 27 is adjacent the forward end of the rocker-shaped cam-slot 32 of the breechblock and is adapted to be moved rearwardly in the horizontal reach of the slot by manual actuation of the guide-members 26 and 27 without affecting the breechblock. However, when the pivot-pin subsequently moves into the upwardly-and-rearwardly-sloping portion of the cam-slot, the breechblock is pulled down out of locking engagement with the receiver. For brevity, the pivot-pin and cam-slot connection between the guide-members 26 and 27 and the breechblock is hereinafter referred to as a "lost-motion linkage."

The breechblock 23 of the present embodiment is provided with the usual type of axially-aligned reciprocating firing-pin 34 and a reciprocating ejector 35, the rear end of which is seen in Figs. 2 and 3. The top of the breechblock comprises a cylindrical surface of revolution, the curvature of which conforms substantially to that of the relief-recess 22 in the underside of the top wall of the receiver and is provided at its rear end with an integral upwardly-projecting locking-lug 36 adapted to be moved into and out of engagement with the chamber-extension of the chamber-unit, in the manner and for the purpose hereinafter described.

The breechblock-actuating means comprises an inertia-bar, action-spring and link assembly supported, in the main, in the buttstock of the firearm. The link of this assembly is indicated at 37, its forward end being adapted to extend between the inside faces of the depending sides 33 of the breechblock and to be pivotally connected

4

to the latter by the transverse pin 31. The rear end of the link 37 is pivotally connected to the forward end of an inertia-bar 38 which is slidably supported in a sleeve 39 threaded or otherwise secured at its forward end to the rear wall of the receiver and projecting rearwardly through an axial aperture 40 in the buttstock. The rear end of the sleeve 39 projects into the forward end of a longitudinal counterbore 41 of the aperture 40, the counterbore 41 being adapted to accommodate a second sleeve 42 which is threadedly secured at its forward end to the rear end of the sleeve 39 and which is closed at its rear end by a screw-cap or plug 43. The sleeve 42 is adapted to support the action-spring 44, the rear end of which engages against the plug 43. The forward end of the action-spring engages an annular flange 45 formed at the forward end of an inertia-weight 46 which, in turn, extends rearwardly from and is suitably secured to the rear end of the inertia-bar 38.

One embodiment of the improved chamber-unit of this invention is indicated generally at 47, and as shown in Figs. 2, 3, 4 and 7, comprises a chamber-member 48 and chamber-extension 51, hereinafter described. The former consists of a substantially-cylindrical sleeve having a reduced neck-portion 49 at its forward end and an annular shoulder 50 at its rear end, the shoulder 50 being provided with exterior screw threads whereby the rear end of the chamber is adapted to be threadedly secured to the forward end of the chamber-extension 51. Referring again to the chamber-member 48, the over-all length of the latter is considerably in excess of the length of a cartridge. Further, the inside diameter of the chamber-member is such that a cartridge is adapted to make a snug fit therein, whereas the outside diameter of the chamber-member is such that the latter will make a substantially-gas-tight sliding fit in a longitudinal counterbore 52 formed axially in the breech-end of the barrel 12, the counterbore 52 having a portion 53 of reduced diameter at its forward end which intersects the rear end of the barrel-bore 54 and in which the neck-portion 49 of the chamber-member 48 is adapted to fit. As indicated in Fig. 2, when the chamber-unit 47 is in its normal forward position in the receiver-and-barrel assembly, the forward end of the neck-portion 49 of the chamber-member abuts the substantially-annular square-shoulder 55 formed at the intersection of the reduced portion 53 of the counterbore 52 and the rear end of the barrel-bore 54, the annular shoulder 50 at the rear end of the chamber-member being in abutting engagement with the breech-end 120 of the barrel.

The chamber-extension 51 of the chamber-unit may be secured rigidly to the rear end of the chamber-member 48, and to this end the forward end of the chamber-extension comprises an annulus 56 having internal threads adapted to be engaged with the externally-threaded shoulder 50 of the chamber-member, whereby the forward ends or faces of the annulus 56 and of the annular shoulder 50 of the chamber-members respectively lie in substantially the same vertical plane. Thus, when the chamber-unit is in its normal forward position in the firearm, the forward ends or faces of both the annular shoulder 50 and the annulus 56 will be in abutting engagement with the rear end 120 of the barrel, as shown in Fig. 2. Although a rigid connection between these two respective members of the chamber-unit is satisfactory, it will be under-

5

stood that other types of connections may be used as, for example, a non-rigid articulated connection shown in a second embodiment of the invention described below. As pointed out above, the over-all length of the chamber-extension 51 is such that when the chamber-unit 47 is in its normal forward position in the receiver-and-barrel assembly, the rear end of the chamber-extension 51 is spaced forwardly of the fixed transverse shoulder 21 of the receiver a predetermined distance which is but a small fraction of the distance moved by the breechblock during its opening stroke, that is to say, from its forward breech-closing position to its rearmost position in the receiver, this small fractional distance being in the ratio of substantially 1 to 0.025 of the opening stroke of the breechblock and corresponding to substantially 0.075 inch for an opening stroke of substantially 3 inches.

As indicated in Fig. 7, the chamber-extension 51 comprises a substantially-cylindrical sleeve of uniform internal and external diameters, the forward end of which constitutes the aforesaid annulus 56. The outside diameter of the chamber-extension corresponds substantially to the diameter of the relief-recess 22 formed on the inside of the top wall of the receiver, whereas the inside diameter of the chamber-extension is somewhat greater than the inside diameter of its chamber-member, so that a fired cartridge case will have a free fit therein, the inside diameter of the extension corresponding substantially to that of the curved upper surface of the breechblock, as a consequence of which the chamber-extension is adapted to be slidingly guided and supported for longitudinal movement in the receiver by the arcuate surface of the relief-recess 22 in the top wall of the receiver and by the curvilinear upper surface of the breechblock respectively, as indicated clearly in Fig. 5. The upper surface of the chamber-extension 51 is provided with a reversed-L-shaped aperture 57 consisting of a longitudinal slot 58, the longitudinal axis of which intersects the vertical axis of the sleeve; and a substantially-rectangular enlargement 59 intersecting the rear end of the slot and displaced transversely to one side thereof. The inverted-L-shaped locking-aperture 57 is thus adapted to receive the locking-lug 36 of corresponding shape formed on the top of the breechblock so as to lock the latter in engagement with the chamber-extension. To this end, the rear end of the inverted-L-shaped locking-aperture 57 is provided with an undercut beveled shoulder 60 adapted to be engaged by the beveled shoulder 61 at the rear of the breechblock locking-lug 36 when the latter is elevated into the inverted-L-shaped locking-aperture 57 of the chamber-extension, as hereinafter described.

Referring to Figs. 5, 6 and 7, the bottom of the sleeve-like chamber-extension 51 is slabbed off or otherwise operated upon in such manner that the left-hand side wall of the sleeve is formed with a substantially-straight longitudinal bottom edge 62 extending uninterruptedly from the rear face of the annulus 56 to the rear end of the chamber-extension, the right-hand side wall thereof being formed with a straight bottom edge 63 which extends from the rear end of the chamber-extension forwardly a relatively-short distance, its forward end intersecting the substantially-vertical rear edge 64 of a clearance cut-out 65 formed in the right-hand wall of the sleeve. Both the bottom edge 62 and the relatively-short bottom edge 63 of the chamber-

6

extension lie in the same horizontal plane. Moreover, the inside faces of the respective side walls of the chamber-extension are milled or otherwise formed with substantially-planar vertical surfaces 66 and 67 respectively which intersect the corresponding bottom edges 62 and 63 of the side walls and are adapted to lie in juxtaposition to the corresponding side walls of the breechblock, see Figs. 5 and 6, the planar-vertical surface 66 being adapted to guide the latter during its longitudinal movement with respect to the chamber-extension, as hereinafter described. The planar-vertical surface 67 of the right-hand wall is recessed laterally to form a longitudinal guide-groove 68 substantially rectangular in cross section and opening inwardly to accommodate the extractor 69 of the breechblock. In this capacity the extractor constitutes, in effect, a spline movable longitudinally in the guide-groove 68 and incorporating the function of a key to prevent rotation of the chamber-unit with respect to the breechblock when the latter is approaching or returning from the end of its rearward excursion in the receiver. When the breechblock is in its forward breech-closing position, the extractor 69 is adapted to engage in a clearance-groove 560 of similar cross section in the annulus 56 of the chamber-extension 51.

The aforementioned aperture or cut-out 65 formed in the right-hand side wall of the chamber-extension member is defined at its rear end by the substantially-vertical edge 64 and at its forward edge by the rear face of the annulus 56. The upper edge 70 of the aperture 65 extends uninterruptedly between the respective edge 64 and the rear face of the annulus and lies in a horizontal plane which is above the horizontal plane of the longitudinal axis of the chamber-extension, such that when the chamber-unit is assembled in the receiver of the firearm, the upper edge 70 of the aperture 65 will coincide substantially with the upper edge of the ejection port 71 in the right-hand side wall of the receiver, as indicated in Fig. 1.

The chamber-extension 51 is adapted to be provided with resilient-means to hold the chamber-unit in its normal forward position in the receiver and to return the chamber-unit from its rearmost position in the receiver to its normal forward position and to this end an aperture 72 is formed in the rear end of the chamber-extension extending longitudinally in the top wall thereof, the aperture 72 being adapted to be substantially opposite the transverse shoulder 21 of the receiver when the chamber-unit is supported therein, as shown in Figs. 2 and 3. Mounted in the aperture 72 is a coil-spring 73, the over-all length of which is greater than the depth of the aperture 72 so that a portion of the rear end of the spring extends rearwardly beyond the rear end of the chamber-extension. Consequently, when the chamber-unit is in its normal forward position in the barrel-receiver assembly, the rear end of the spring is immediately opposite and preferably in engagement with the transverse shoulder 21 of the receiver so as to constantly urge the chamber-unit forwardly in the receiver. Although but one return-spring 73 is shown in the present embodiment, it will be appreciated that one or more than one may be used with equal success.

A modification of the chamber-unit is indicated generally at 75 in Figs. 8 through 11, and is characterized by an articulated connection between the chamber-member and chamber-extension of

the aforesaid unit. Whereas the chamber-member 48 of the chamber-unit 47 is provided with an externally-threaded shoulder 50, the rear end of the chamber-member 76 of the chamber-unit 75 is provided with a relatively-thick annular flange 77 which circumscribes a portion of the bottom side of the chamber-member. The flange subtends an angle which is of the order of 130°, the right-hand end of the flange terminating in a substantially-square shoulder 78 which is disposed in a horizontal plane slightly below the horizontal plane through the longitudinal axis of the chamber-member; the opposite or left-hand end of the flange terminating in a substantially-square shoulder 79 which lies in a horizontal plane below the plane of the shoulder 78. Circumscribing the breech-end of the chamber-member from the flange-shoulder 79 to a point on the opposite side thereof are a pair of spaced parallel substantially-annular ribs 80 and 81 which are preferably formed integrally with the chamber-member, each rib being substantially rectangular in cross section. The right-hand end of the rearmost rib 80 terminates in a horizontal plane slightly above the horizontal plane of the longitudinal axis of the chamber-member, and is spaced vertically from the shoulder 78 a distance corresponding substantially to the vertical dimension of the extractor 69 of the breechblock to form a slot 82 to receive the forward end of the extractor when the breechblock is in its closed position. The corresponding end of the annular rib 81 is blended into the flange 77 while the opposite or left-hand ends of the ribs 80 and 81 are blended into the corresponding end of the flange 77.

Referring to Fig. 8, the vertical plane of the front face of the foremost annular rib 81 and of the front face of the flange 77 will be seen to be substantially co-extensive, as a consequence of which both of these respective faces are adapted to abut the rear end 120 of the barrel when the chamber-unit 75 is in its normal forward position in the firearm.

The annular ribs 80 and 81 are adapted to circumscribe an angle of substantially 220° and, in conjunction with the flange 77, are adapted to make articulated engagement with the forward end of the chamber-extension 83. The latter is substantially similar in all respects to the chamber-extension 51 of the chamber-unit 47 except as to the construction of its forward end. The latter comprises a substantially-semicircular arc 84, the left-hand end 85 of which terminates in the horizontal plane of the lower edge 86 of the chamber-extension, whereas the right-hand end 87 of the arc 84 terminates substantially in a horizontal plane of the longitudinal axis of the chamber-extension. The inner wall of the arcuate end 84 of the extension is provided with an annular groove 88 which is substantially rectangular in cross section and is adapted to receive the annular rib 80 on the rear end of the chamber-member to couple the two members in operative relationship. Since both the annular ribs 80 and 81 and the arcuate end of the chamber-extension circumscribe angles of more than 180°, the two members are assembled by engaging the right-hand end 87 of the extension in the extractor-slot 82 of the chamber-member and then swinging the arcuate end 84 of the extension downwardly into coupling engagement with the annular rib 80 of the chamber until the left-hand end 85 of the arcuate edge 84 engages the shoulder 79 of the chamber. The chamber-extension

is thus locked to the chamber-member, although not rigidly, there being articulation of the order of two or three thousandths inches in the joint to compensate for any mis-alignment of the barrel-bore and the chamber of the receiver.

The rear end of the chamber-extension is provided with a recessed groove 89 adapted to accommodate the extractor 69 of the breechblock and to function as a keyway for the latter, whereby the chamber-extension is precluded from rotating clockwise relative thereto, as seen in Fig. 9, which circumstance, if permitted, would partially close the extractor-slot 82 and cause a jam. Moreover, rotation of the chamber-extension in a counterclockwise direction is positively prevented by engagement of the left-hand end 85 of the extension with the shoulder 79 of the chamber-member, as described above. The latter is, in turn, positively held from rotating in the breech-end of the barrel by means of a longitudinal key 90 (see Figs. 8 and 9) which is supported in a longitudinal slot 91 formed in the bottom of the barrel-receiving aperture 100 in the front wall of the receiver, the key 90 being adapted to engage in a longitudinal keyway 92 provided in the bottom of the flange 77 of the chamber-member.

Although the chamber-unit 75 is characterized by an articulated joint between the chamber-members 76 and the chamber-extension 83, so as to compensate for variations in alignment of the barrel-bore and the chamber of the receiver, it will be understood that insofar as its function is concerned, the modified chamber-unit 75 operates substantially identically to the chamber-unit 47.

The operation of the improved firearm of the invention may be described briefly as follows. Assuming the elements of the firearm are in the positions shown in Fig. 2, with the chamber-unit 47 in its normal forward position in the receiver-barrel assembly such that the forward end 49 of the chamber-member 48 is in abutting engagement with the shoulder 55 of the barrel-bore 54 and the rear end of the chamber-extension 51 is forwardly of the shoulder of the receiver a distance corresponding substantially to 0.075 inch, the breechblock 23 is in its normal forward breech-closing position wherein the locking-lug 36 of the breechblock is engaged in the reversed-L-shaped locking-aperture 57 of the chamber-extension, the beveled shoulder 61 of the locking-lug being in engagement with the beveled shoulder thereof. Moreover, the locking-lug is securely held in the aperture 57 in the top wall of the chamber-extension by the breechblock-actuating means and more specifically by engagement of the transverse pivot-pin 31 of the action-link 37 in the cam-slots 32 of the breechblock, the pin being urged forwardly into engagement with the forward ends of the cam-slots by the force of the action-return spring 44. The phrase "breechblock-actuating means" as used herein shall be understood to include the inertia-bar, action-spring and link assembly as well as its transverse pivot-pin and cam-slot connection to the breechblock, which is hereinafter referred to as the "lost-motion connection," between the link of the assembly and the breechblock. When the firearm is discharged, the gases created by the discharged cartridge build up within the bore of the barrel and within the forward end of the chamber-member 48 of the chamber-unit, and quickly reach a sufficiently-high pressure to overcome the combined resist-

ances offered by the relatively-light-action return-spring and the chamber-unit return-spring, so as to drive the chamber-unit 47, including the locked breechblock and the breechblock-actuating assembly, rearwardly in the receiver until the rear end of the chamber-extension 51 strikes sharply against the transverse shoulder 21 of the receiver, thereby compressing the chamber-unit return-spring 73 mounted in the rear end of the chamber-extension. During this initial rearward movement of the chamber-unit, breechblock and breechblock-actuating assembly, engagement of the transverse pivot-pin of the spring-loaded action-link in the cam-slots of the breechblock holds the breechblock firmly in locked engagement with the chamber-extension. Moreover, the predetermined and extremely short distance which the chamber-unit moves rearwardly is such that by the time the latter has been stopped by the fixed shoulder 21 of the receiver and the breech-bolt has been unlocked by the action of the lost-motion linkage, the pressure in the bore and counterbore of the barrel has dropped substantially to zero. Engagement of the chamber-unit with the shoulder 21 positively stops further rearward movement of the chamber-unit as well as that of the breechblock which is locked thereto. The breechblock-actuating means is, however, free to continue its rearward movement and on so doing, draws the transverse pin 31 of the lost-motion connection rearwardly in the cam-slots 32 of the breechblock. The immediate effect of this action is to pull the locking-lug of the breechblock out of engagement with the shoulder of the chamber-extension thus unlocking the breechblock therefrom. The inertia force of the moving breechblock-actuating means then acts on the immobile breechblock to drag the latter rearwardly to its rearmost position in the receiver, during which time the cartridge-extractor 69 of the breechblock withdraws the fired cartridge from the chamber-member 48 of the chamber-unit.

It will be appreciated that as soon as the fired cartridge has been withdrawn from the chamber-member in which the cartridge makes a relatively-snug fit into the chamber-extension in which the fired cartridge-case has a free fit, the chamber-unit is freed and thereupon will be moved forwardly into its normal forward position by the force of its compressed return-spring 73, the inertia developed by the forward movement of the chamber-unit acting simultaneously with and in a direction counter to the inertia force of the rearwardly-moving breechblock and action-rod assembly. The recoil force of the firearm is in part, therefore, the resultant of these two oppositely-acting inertia forces and less than the inertia of the breechblock and action-rod assembly. As the breechblock continues its rearward movement in the receiver, the action-spring 44 of the breechblock-actuating assembly is compressed and the extracted cartridge-case is carried rearwardly into the chamber-extension 51 to a position substantially opposite the clearance aperture thereof which, as pointed out above, is substantially co-extensive with the ejection-port 71 in the right-hand wall of the receiver. At the end of its rearward excursion in the receiver, the breechblock is brought to a stop immediately adjacent the rear wall thereof. Simultaneously, the rear end of the spring-mounted ejector-pin 25 is brought sharply into engagement with the rear wall of the receiver so as to be thrust forwardly force-

fully against the rim of the extracted cartridge-case, whereupon the latter is pivotally ejected out of the ejection-port 71 of the receiver. The force of the compressed action-spring 44 thereupon overcomes any residual inertia of the breechblock and moves the latter forwardly in the receiver.

At this point it should be pointed out that the firearm does not employ the usual relatively-heavy recoil-spring but that the relatively-light action-spring 44 serves both as a spring to retard the rearward movement of the breechblock and to move the latter forwardly in the receiver, this dual function of the action-spring being made possible by the fact that the breechblock and the breechblock-actuating assembly are the only elements which move rearwardly in the receiver throughout the entire length of the opening stroke, the chamber-unit 47, having but an extremely small rearward movement and being adapted to set up a counter-recoil force during part of the rearward excursion of the breechblock. Thus, the initial recoil, which is characterized by a blow against the shoulder of the shooter when the firearm is fired, is relatively small. Moreover, the secondary recoil which characterizes firearms embodying a conventional barrel and barrel-extension assembly is substantially eliminated.

The expansion force of the compressed action-spring 44 acting on the inertia-bar 38 and action-link assembly, moves the breechblock forwardly in the receiver, the transverse pin of the action-link riding in the cam-slots 32 of the breechblock. Simultaneously, a fresh cartridge is automatically fed from the magazine 13 onto suitable cartridge-carrier means (not shown) into position in front of the advancing breechblock, whereby the latter engages and enters the fresh cartridge into the chamber-member of the chamber-unit. When the breechblock reaches its forward breech-closing position, the transverse pivot-pin is thereupon moved forwardly in the cam-slots of the breechblock so as to elevate the rear end thereof and, in particular, its locking-lug, up into the locking-aperture 57 of the chamber-extension so as to lockingly engage the rear end of the locking-lug with the beveled shoulder of the aperture. The firing-elements of the firearm are again in position preparatory to firing a fresh cartridge, the latter having been fed from the tubular magazine 13 and introduced into the chamber-member 47 between the spaced parallel edges 62 and 63 of its open bottom by the forwardly-moving breechblock and suitable cartridge-carrier elevating-means (not shown), in a manner conventional with automatic firearms of this general type.

From the foregoing description and drawings, it will be clear that the provision of the improved chamber-unit of this invention having an extremely-short rearward movement, has eliminated the need for a long rearwardly-extending substantially-horizontal chamber in the receiver, as a consequence of which the receiver may be formed with a downwardly-and-rearwardly-curved upper surface to give the firearm a pleasing streamlined appearance. Moreover, the chamber-unit permits the use of a fixed barrel in an automatic firearm, which construction insures better sighting, since the receiver and barrel constitute a rigid unit. Further, since the barrel of the improved firearm of this invention is fixed to the receiver and the rearward excursion of the breechblock is discontinuous, i. e.,

moves rearwardly initially an extremely small fraction of its total opening stroke whereupon it is stopped and subsequently restarted, the shock of recoil of the firearm when fired is reduced to a minimum. And as an additional feature, since the movement of the chamber-unit is but a small fraction of the bolt travel, the chamber-unit never acquires sufficiently high velocity to damage the stop-shoulder of the receiver, while the rearward movement of the breechblock, subsequent to cessation of its rearward excursion at the stop-shoulder of the receiver, is dampened by the resistance offered by the action-return spring and hence brings up at the rear end of the receiver with minimum residual inertia.

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 claims are intended to be embraced therein.

I claim:

1. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; means to positively stop the rearward movement of said chamber-unit on discharge of said firearm after said chamber-unit has moved rearwardly a distance equal to a small fraction of the opening stroke of said breechblock; and breechblock-actuating means connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock, said rearwardly-moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit by engagement thereof with said positive stop and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

2. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; means to positively stop the rearward movement of said chamber-unit on discharge of said firearm after said chamber-unit has moved rearwardly a distance equal to a small fraction of the opening stroke of said breechblock; breechblock-actuating means connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance

of the opening stroke of said breechblock, said rearwardly-moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit by engagement thereof with said positive stop and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke; and resilient-means carried by said chamber-unit and arranged to abut said stop-means to return said chamber-unit to its normal position in said barrel immediately following disengagement of the breechblock from said chamber-extension.

3. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; means to positively stop the rearward movement of said chamber-unit on discharge of said firearm after said chamber-unit has moved rearwardly a distance equal to a small fraction of the opening stroke of said breechblock; breechblock-actuating means connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock, said rearwardly-moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit by engagement thereof with said positive stop and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke; and an action-spring associated with said breechblock-actuating means arranged to resist the rearward movement of said chamber-unit and said breechblock and to return said breechblock to its normal forward position in said receiver.

4. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; means to positively stop the rearward movement of said chamber-unit on discharge of said firearm after said chamber-unit has moved rearwardly a distance equal to a small fraction of the opening stroke of said breechblock; breechblock-actuating means connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock, said rearwardly moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of

13

movement of said breechblock and said chamber-unit by engagement thereof with said positive stop and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke; resilient means carried by said chamber-unit and arranged to abut said stop means to return said chamber-unit to its normal position in said barrel immediately following disengagement of the breechblock from said chamber-extension; and an action-spring associated with said breechblock-actuating means arranged to resist the rearward movement of said chamber-unit and said breechblock and to return said breechblock to its normal forward position in said receiver.

5. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocably mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; means to positively stop the rearward movement of said chamber-unit on discharge of said firearm after said chamber-unit has moved rearwardly a distance equal to substantially 0.025 of the opening stroke of said breechblock; and breechblock-actuating means connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock, said rearwardly-moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit by engagement thereof with said positive stop and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

6. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocably mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; an articulated connection joining said chamber-extension to said chamber-member; means to positively stop the rearward movement of said chamber-unit on discharge of said firearm after said chamber-unit has moved rearwardly a distance equal to a small fraction of the opening stroke of said breechblock; and breechblock-actuating means connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock, said rearwardly-moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit by engagement thereof with said positive stop and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

14

ceiver through the remaining portion of its opening stroke.

7. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocably mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; an articulated connection joining said chamber-extension to said chamber-member; means cooperatively associated with said chamber-unit and said receiver to prevent rotation of said chamber-unit therein; means to positively stop the rearward movement of said chamber-unit on discharge of said firearm after said chamber-unit has moved rearwardly a distance equal to a small fraction of the opening stroke of said breechblock; and breechblock-actuating means connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock, said rearwardly-moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit by engagement thereof with said positive stop and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

8. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocably mounted in said receiver; said breechblock having an extractor; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; said chamber-extension having a keyway constructed and arranged to accommodate said extractor so as to prevent rotation of said chamber-unit in said receiver; means to positively stop the rearward movement of said chamber-unit on discharge of said firearm after said chamber-unit has moved rearwardly a distance equal to a small fraction of the opening stroke of said breechblock; and breechblock-actuating means connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock; said rearwardly-moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit by engagement thereof with said positive stop and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

9. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocably mounted in

15

said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; a stop-shoulder in said receiver, said shoulder being located rearwardly of the breech-end of said barrel a distance comprising a small fraction of the opening stroke of said breechblock, said shoulder being arranged to project into the path of the rearwardly-moving chamber-extension to stop the rearward movement thereof on discharge of said firearm; and breechblock-actuating means connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock until said chamber-extension engages said stop-shoulder, said rearwardly-moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

10. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver, a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; a stop-shoulder in said receiver, said shoulder being located rearwardly of the breech-end of said barrel a distance comprising a small fraction of the opening stroke of said breechblock, said shoulder being arranged to project into the path of the rearwardly-moving chamber-extension to stop the rearward movement thereof on discharge of said firearm; breechblock-actuating means connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock until said chamber-extension engages said stop-shoulder, said rearwardly-moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke; and resilient-means carried by said chamber-extension and arranged to abut said stop-shoulder to return said chamber-unit to its normal position in said barrel immediately following disengagement of the breechblock from said chamber-extension.

11. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; a stop-shoulder in said

16

receiver, said shoulder being located rearwardly of the breech-end of said barrel a distance comprising a small fraction of the opening stroke of said breechblock, said shoulder being arranged to project into the path of the rearwardly-moving chamber-extension to stop the rearward movement thereof on discharge of said firearm; breechblock-actuating means connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock until said chamber-extension engages said stop-shoulder, said rearwardly-moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke; resilient-means carried by said chamber-extension and arranged to abut said stop-shoulder to return said chamber-unit to its normal position in said barrel immediately following disengagement of the breechblock from said chamber-extension; and an action-spring associated with said breechblock-actuating means arranged to resist the rearward movement of said chamber-unit and said breechblock and to return said breechblock to its normal forward position in said receiver.

12. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; a stop-shoulder in said receiver, said shoulder being located rearwardly of the breech-end of said barrel a distance comprising substantially 0.025 of the opening stroke of said breechblock, said shoulder being arranged to project into the path of the rearwardly-moving chamber-extension to stop the rearward movement thereof on discharge of said firearm; and breechblock-actuating means connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock until said chamber-extension engages said stop-shoulder, said rearwardly-moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

13. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rear-

17

wardly into said receiver; a stop-shoulder in said receiver, said shoulder being located rearwardly of the breech-end of said barrel a distance comprising a small fraction of the opening stroke of said breechblock, said shoulder being arranged to project into the path of the rearwardly-moving chamber-extension to stop the rearward movement thereof on discharge of said firearm; and breechblock-actuating means comprising lost-motion linkage connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock until said chamber-extension engages said stop-shoulder, the said lost-motion linkage of said rearwardly-moving breechblock-actuating means being arranged thereafter to unlock said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit and to draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

14. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; a stop-shoulder in said receiver, said shoulder being located rearwardly of the breech-end of said barrel a distance comprising a small fraction of the opening stroke of said breechblock, said shoulder being arranged to project into the path of the rearwardly-moving chamber-extension to stop the rearward movement thereof on discharge of said firearm; and breechblock-actuating means comprising an inertia-bar and lost-motion linkage connected to said breechblock, said breechblock actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock until said chamber-extension engages said stop-shoulder, the said inertia-bar being arranged to continue the uninterrupted rearward movement of said lost-motion linkage, whereby the latter unlocks said breechblock from the said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit and draws the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

15. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; a stop-shoulder in said receiver, said shoulder being located rearwardly of the breech-end of said barrel a distance comprising substantially 0.025 of the opening stroke of said breechblock, said shoulder being arranged

18

to project into the path of the rearwardly-moving chamber-extension to stop the rearward movement thereof on discharge of said firearm; and breechblock-actuating means comprising an inertia-bar and lost-motion linkage connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock until said chamber-extension engages said stop-shoulder, the said inertia-bar being arranged to continue the uninterrupted rearward movement of said lost-motion linkage, whereby the latter unlocks said breechblock from said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit and draws the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

16. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver; a stop-shoulder in said receiver, said shoulder being located rearwardly of the breech-end of said barrel a distance comprising a small fraction of the opening stroke of said breechblock, said shoulder being arranged to project into the path of the rearwardly-moving chamber-extension to stop the rearward movement thereof on discharge of said firearm; breechblock-actuating means comprising an inertia-bar and a lost-motion linkage, said linkage being connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock until said chamber-extension engages said stop-shoulder, the said inertia-bar being arranged to continue the uninterrupted rearward movement of said lost-motion linkage, whereby the latter unlocks said breechblock from said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit and draws the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke; and resilient-means carried by said chamber-extension and arranged to abut said stop-shoulder to return said chamber-unit to its normal position in said barrel immediately following disengagement of the breechblock from said chamber-extension.

17. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver, an articulated connection joining said chamber-extension to said chamber-member; a stop-shoulder in said receiver, said shoulder being located rearwardly of

19

the breech-end of said barrel a distance comprising a small fraction of the opening stroke of said breechblock, said shoulder being arranged to project into the path of the rearwardly-moving chamber-extension to stop the rearward movement thereof on discharge of said firearm; and breechblock-actuating means comprising an inertia-bar and a lost-motion linkage, said linkage being connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock until said chamber-extension engages said stop-shoulder, the said inertia-bar being arranged to continue the uninterrupted rearward movement of said lost-motion linkage, whereby the latter unlocks said breechblock from said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit and draws the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

18. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver, an articulated connection joining said chamber-extension to said chamber-member; means cooperatively associated with said chamber-unit and said receiver to prevent rotation of said chamber-unit therein; a stop-shoulder in said receiver, said shoulder being located rearwardly of the breech-end of said barrel a distance comprising a small fraction of the opening stroke of said breechblock, said shoulder being arranged to project into the path of the rearwardly-moving chamber-extension to stop the rearward movement thereof on discharge of said firearm, and breechblock-actuating means comprising an inertia-bar and a lost-motion linkage, said linkage being connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock until said chamber-extension engages said stop-shoulder, the said inertia-bar being arranged to continue the uninterrupted rearward movement of said lost-motion linkage, whereby the latter unlocks said breechblock from said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit and draws the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

19. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver, said breechblock having an extractor; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into said receiver, said chamber-extension having a

20

keyway constructed and arranged to accommodate said extractor so as to prevent rotation of said chamber-unit in said receiver; a stop-shoulder in said receiver, said shoulder being located rearwardly of the breech-end of said barrel a distance comprising a small fraction of the opening stroke of said breechblock, said shoulder being arranged to project into the path of the rearwardly-moving chamber-extension to stop the rearward movement thereof on discharge of said firearm; and breechblock-actuating means comprising an inertia-bar and a lost-motion linkage, said linkage being connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold said breechblock in locked engagement with the said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock until said chamber-extension engages said stop-shoulder, the said inertia-bar being arranged to continue the uninterrupted rearward movement of said lost-motion linkage, whereby the latter unlocks said breechblock from said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit and draws the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

20. In an automatic firearm, the combination including a receiver; a barrel fixed to said receiver; a breechblock reciprocally mounted in said receiver; a lug on said breechblock; a chamber-unit comprising a chamber-member slidably supported in said barrel and a chamber-extension projecting rearwardly into a receiver, said chamber-extension having a bolt-locking shoulder; a stop-shoulder in said receiver, said shoulder being located rearwardly of the breech-end of said barrel a distance comprising a small fraction of the opening stroke of said breechblock, said shoulder being arranged to project into the path of the rearwardly-moving chamber-extension to stop the rearward movement thereof on discharge of said firearm; and breechblock-actuating means comprising an inertia-bar and lost-motion linkage connected to said breechblock, said breechblock-actuating means being arranged to move rearwardly with said breechblock and simultaneously to hold the breechblock lug in locking engagement with the locking-shoulder of said chamber-extension of said chamber-unit when said firearm is discharged, whereby said breechblock and said chamber-unit move rearwardly concurrently through the said fractional distance of the opening stroke of said breechblock until said chamber-extension engages said stop-shoulder, the said inertia-bar being arranged to continue the uninterrupted rearward movement of said lost-motion linkage, whereby the latter withdraws the lug of said breechblock out of locking engagement with the shoulder of said chamber-extension, thereby to unlock said breechblock from said chamber-extension immediately succeeding cessation of movement of said breechblock and said chamber-unit and draw the immobile breechblock rearwardly in said receiver through the remaining portion of its opening stroke.

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No references cited.