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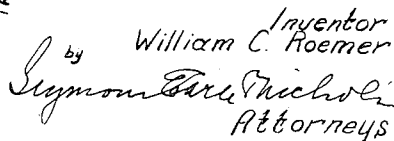
W. C. ROEMER

2,321,045

AUTOMATIC BOLT-STOP FOR REPEATING FIREARMS

Filed Feb. 9, 1940

2 Sheets-Sheet 1



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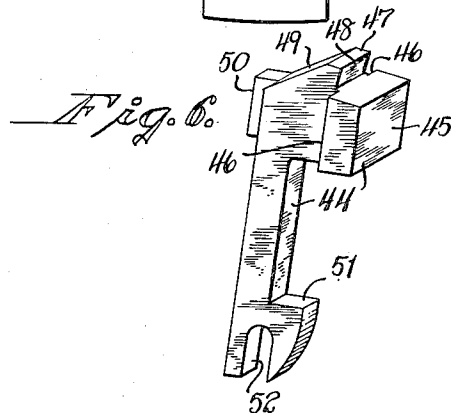
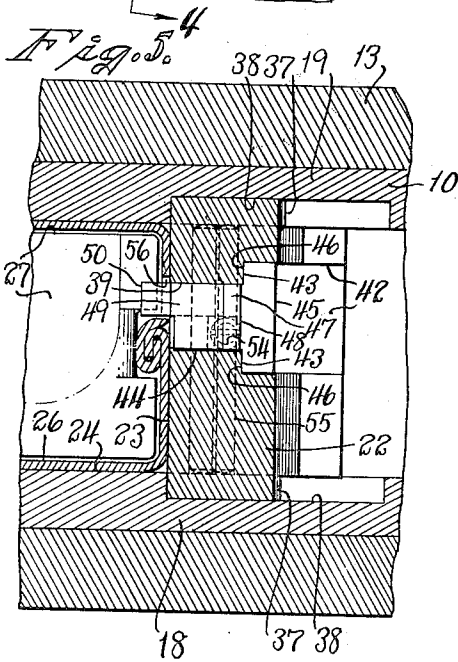
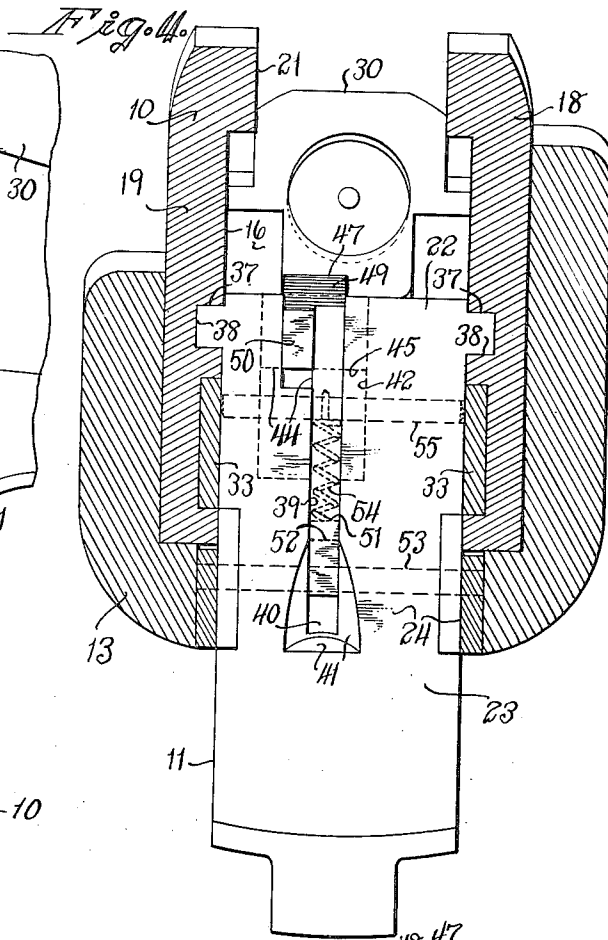
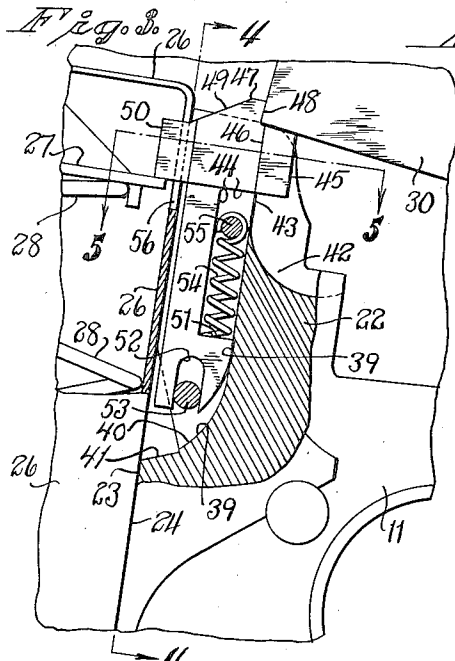
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AUTOMATIC BOLT STOP FOR REPEATING
FIREARMS

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2 Claims. (Cl. 42—18)

The present invention relates to improvements in firearms and more particularly to improvements in automatic bolt-stops for firearms, that is to say, bolt-stops which will automatically hold the breech-bolt of a firearm in its retired or open position when the last cartridge from the magazine has been used.

One of the objects of the present invention is to provide a repeating firearm with superior means whereby the breech-bolt thereof may be automatically held in its retired or open position following the emptying of the magazine of the firearm.

Another object of the present invention is to provide superior bolt-stopping means for the purpose above referred to which will successfully withstand the repeated shocks of checking the forward movement of a breech-bolt, over long periods of continued use and without liability to malfunctioning or breakdown.

A further object of the present invention is to provide superior bolt-stopping means of the general nature referred to which combines a ruggedness and surety of operation with low cost for manufacture and ease of removal when required.

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 view partly in vertical central-longitudinal section and partly in side elevation of the central portion of a repeating firearm equipped with an automatic bolt-stopping mechanism embodying the present invention, the parts being shown in the positions which they occupy when the breech-bolt is closed and a supply of cartridges is in the magazine;

Fig. 2 is a view substantially corresponding to Fig. 1 though less comprehensive than the same and showing the parts in the positions which they assume when the magazine is empty and the breech-bolt is held in its retired position;

Fig. 3 is a broken view in vertical central-longitudinal section of the parts of the firearm immediately adjacent the rear of the box-magazine and showing, on an enlarged scale, the breech-bolt being retained in its retired position by the bolt-stop;

Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a broken horizontal sectional view taken on the line 5—5 of Fig. 3; and

Fig. 6 is a perspective view of the bolt-stopping member detached.

The particular repeating firearm chosen for purposes of illustrating one form of the present invention includes a receiver 10, a trigger-plate 11, a barrel 12 and a stock 13.

The barrel 12 is provided at its rear with an axial cartridge-chamber 14 and with a bore 15 leading forwardly therefrom. At its rear the said barrel 12 is, in a manner customary in firearms, threaded into a suitable opening in the forward end of the receiver 10 so as to normally form a rigid extension of the said receiver.

The receiver 10 is formed interiorly with a mechanism-receiving chamber 16 and includes a top-wall 17 as well as a left side-wall 18 and a right side-wall 19 spaced from each other so as to form the lateral boundaries of the mechanism-receiver 16 before referred to. The top-wall 17 of the receiver 10 is cut away to provide a forwardly-facing bolt-locking abutment 20 constituting the rear wall of a passage 21 extending from the mechanism-receiving chamber 16 upwardly to the top surface of the receiver 10.

Secured along the under face of the receiver 10 is the trigger-plate 11 before referred to, which partially closes the underside of the said receiver and which may be considered as constituting a "receiver-unit" in conjunction with the said receiver. The said trigger-plate 11 is provided about midway of its length with a lug 22 projecting upwardly between the complementary side-walls 18 and 19 of the receiver 10 into the mechanism-receiving chamber 16 thereof. The forward face of the lug 22 just referred to constitutes the rear wall 23 of a magazine-receiving passage 24 formed in the receiver-unit. The front-wall 25 of the magazine-receiving passage 24 just referred to is composed mainly by the portion of the receiver immediately below the rear end of the barrel 12, together with the adjacent portion of the trigger-plate 11 as is shown particularly well in Figs. 1 and 2.

Removably installed in the magazine-receiving passage 24 above referred to, is a box-magazine 26 containing a cartridge-follower 27 urged upwardly in the manner customary in box-magazines by a magazine-spring 28. Normally superimposed upon the upper surface of the cartridge-follower 27 is a column of cartridges 29, the uppermost one of which is normally thrust by the magazine-spring 28 against the underside of a tilting and reciprocating breech-bolt 30 when

the same is in its breech-closing position, as shown in Fig. 1. The breech-bolt 30 is movable within the mechanism-receiving chamber 16 in the receiver 10 and is provided with a rearwardly-facing locking-abutment 31 engageable with the bolt-locking abutment 20 of the receiver 10.

Pivotally connected to the rear end of the breech-bolt 30 is the upper end of a bolt-operating link 32 having its lower end pivotally connected to the rear portion of an action-slide 33. The said action-slide is adapted to reciprocate in a direction substantially parallel with the longitudinal dimensions of the firearm, and is provided at its rear end with a spring-guiding plunger 34 having a rearwardly-facing shoulder 35 against which thrusts the forward end of a helical bolt-closing spring 36. The said bolt-closing spring in a manner customary in automatic firearms exerts a constant but yielding effort to urge the action-slide 33 forwardly and hence to retain the breech-bolt 30 in its breech-closing position, as shown in Fig. 1.

As will be especially well apparent in Figs. 4 and 5 of the drawings, the upstanding lug 22 of the trigger-plate 11 is formed with two laterally-projecting coupling-ribs 37—37 respectively formed on the opposite sides of the said lug 22, and each extending into one of two coupling-grooves 38—38 respectively formed in the inner faces of the complemental side-walls 18 and 19 of the receiver 10.

The front face of the lug 22 of the trigger-plate 11 is formed with a vertically-extending groove 39 which intersects the upper edge of the said lug at the top thereof and which is formed with a downwardly-and-forwardly-curved lower portion 40 intersecting a clearance-notch 41, for the purpose as will hereinafter appear. Formed in the rear face of the upper portion of the lug 22 is a groove 42 wider than the groove 39 and intersecting the upper portion of the latter, as is particularly well shown in Figs. 3 and 5. The relationship of the grooves 39 and 42 just referred to is such that adjacent the upper end of the lug 22 the said grooves combine to form a substantially T-shaped recess having two spaced-apart and rearwardly-facing bearing-surfaces 43—43.

Adapted to vertically reciprocate in both of the grooves 39 and 42 in the lug 22 of the trigger-plate 11, is a bolt-stopping member generally designated by the reference character 44 and shown particularly well in Fig. 6. The bolt-stopping member 44 is mainly located in the groove 39 in the front of the lug 22 and has substantially only its rearwardly-offsetting head 45 located in the rear groove 42 in the said lug. The said head 45 is located at the rear of the upper portion of the bolt-stopping member 44 and together with the adjacent portion of the member 44 forms a substantially T-shaped section horizontally. The said head 45 also projects laterally on each of the respective opposite sides of the main portion of the bolt-stopping member 44 and provides two laterally-spaced-apart and forwardly-facing bearing-surfaces 46—46. Each of the said bearing-surfaces 46—46 is slidably engaged with one of the two bearing-surfaces 43—43 constituting partial front wall-portions of the groove 42 in the rear of the lug 22.

Projecting upwardly beyond the head 45 of the bolt-stopping member 44 is a bolt-stopping nose 47 having a substantially-vertical but slightly rearwardly-inclined rear face 48 engageable by the lower portion of the front face of the breech-

bolt 30, as is shown particularly well in Figs. 2 and 3. The bolt-stopping nose 47 is also provided with a forwardly-and-downwardly-sloping cam-surface 49. To one side of its vertical center and in substantial horizontal alignment with the head 45, the bolt-stopping member 44 is formed with a forwardly-projecting lifting-nose 50, the under face of which is adapted to be engaged by the cartridge-follower 27 of the box-magazine 26, for the purpose as will hereinafter appear.

Below its head 45 and adjacent its lower end, the bolt-stopping member 44 is formed with an upwardly-facing spring-seat 51. Below the spring-seat 51 the member 44 is formed with a downwardly-opening laterally-extending guide-notch 52.

When the bolt-stopping member 44 is installed in the grooves 39 and 42 of the lug 22 of the trigger-plate 11, the guide-notch 52 in its lower end receives the central portion of a guide-pin 53 extending transversely across the lower portion of the lug 22. The head 45 of the bolt-stopping member 44 is located in the rear groove 42 in the lug 22 so that its forwardly-facing bearing-surfaces 46—46 are in sliding engagement with the rearwardly-facing bearing-surfaces 43—43. The spring-seat 51 of the bolt-stopping member 44 is engaged by the lower end of a helical spring 54 having its upper end looped over a pin 55 extending across the rear portion of the front groove 39 in the lug 22. The spring 54 exerts a constant yielding effort to depress the bolt-stopping member 44 but has a much lower tension than has the magazine-spring 28 of the box-magazine 26, all for the purpose as will hereinafter appear.

The lifting-nose 50 of the bolt-stopping member 44 projects forwardly beyond the front face of the lug 22 and is adapted to project into the interior of the box-magazine 25 through a notch 56 in the latter when the box-magazine is in place in the firearm, so as to be engageable by the cartridge-follower 27 within the said box-magazine.

Normally, when the box-magazine 23 contains one or more cartridges such as the column of cartridges 29 shown in Fig. 1, the cartridge-follower 27 is held depressed well below the under face of the lifting-nose 50 of the bolt-stopping member 44. Under these conditions and as shown in Fig. 1, the spring 54 serves to maintain the bolt-stopping member 44 in its lowermost position, in which its bolt-stopping nose 47 is below the path of movement of the forward lower corner of the breech-bolt 30. Now, when the said breech-bolt 30 is moved rearwardly in any suitable manner such, for instance, as by the gas-operated piston shown in my joint co-pending application, Serial No. 313,650, filed January 13, 1940, the said breech-bolt will not be prevented from being moved forwardly into its breech-closing position by the bolt-closing spring 36.

When, however, the last cartridge has been removed from the box-magazine 26, the cartridge-follower 27 therein will rise sufficiently to engage the upper surface of its rear portion with the under surface of the lifting-nose 50 of the bolt-stopping member 44. Owing to the fact that the magazine-spring 28 is much more powerful than is the spring 54 normally serving to depress the bolt-stopping member 44, the said member 44 will be bodily shifted upwardly from the position in which it is shown in Fig. 1, into the position in which it is shown in Figs. 2, 3 and 4, to be

thereby in position in readiness to interpose its bolt-stopping nose 47 in the path of movement of the lower forward corner of the said breech-bolt when the latter is moved forwardly by the bolt-closing spring 36 following its being thrown rearwardly by the discharge of the last cartridge. When the last cartridge is removed from the box-magazine 26 and inserted into the cartridge-chamber 14 of the barrel 12 by a forward movement of the breech-bolt 30, the bolt-stopping member 44 will, in the manner described, be lifted into its uppermost position by the engagement of the cartridge-follower 27 with the lifting-nose 50. Under these conditions, the discharge of the cartridge just inserted into the cartridge-chamber 14 will cause the rearward retirement of the breech-bolt 30 against the counter-urge of the bolt-closing spring 36, and as the said breech-bolt travels rearwardly, its under face will engage with the cam-surface 49 of the bolt-stopping member 44 toward the end of the stroke of the said breech-bolt, with the effect of camming the said bolt-stopping member 44 downwardly. As soon, however, in its rearward travel, as the forward lower corner of the breech-bolt 30 passes the rear face 48 of the bolt-stopping nose 47, the entire bolt-stopping member 44 will rise under the urge of the magazine-spring 28 into position to check the forward movement of the said breech-bolt and to hold the same in the position in which it is shown in Figs. 2, 3 and 4.

Following the above, removal of the box-magazine 26 from the magazine-receiving passage 24 in the firearm-structure will relieve the bolt-stopping member 44 of upward thrust. Under these conditions and owing to the slight rearward inclination of the rear face 48 of the bolt-stopping nose 47 of the member 44 and the frictional engagement therewith of the breech-bolt, the spring 54 will be prevented from immediately depressing the bolt-stopping member 44 to release the breech-bolt 30. The box-magazine 26 may be reloaded and replaced in the magazine-receiving passage 24 of the firearm-structure, or a fresh and corresponding magazine with a charge of cartridges may be used in its stead. After the insertion of a magazine containing a fresh charge of cartridges, a slight rearward draft upon the action-slide 33 or upon the breech-bolt 30 will permit the spring 54 of the bolt-stopping member 44 to depress the said member into the position in which it is shown in Fig. 1, thereby permitting the breech-closing spring 36 to move the breech-bolt 30 into its breech-closing position, as shown in Fig. 1. The bolt-stopping member 44 will remain in its depressed position until such time as it is again raised in a manner as before described by the exhaustion of the column of cartridges in the magazine and the consequent rise of the cartridge-follower 27, or one like it, into its uppermost position.

Should it be desired to retract the breech-bolt after the removal of the magazine and to retain the said breech-bolt in its retired position for cleaning or inspecting the firearm, this may be accomplished by inserting a finger, or a suitable tool if desired, into the clearance-notch 41 and raising the bolt-stopping member 44 against the tension of the spring 54 sufficiently to position its bolt-stopping nose 47 forwardly of the breech-bolt to thus securely hold the said breech-bolt in its retired position.

It will be appreciated that a very considerable shock is applied to the bolt-stopping member 44

when it is called upon to check the rapid forward movement of the breech-bolt 30 under the urge of the relatively-powerful bolt-closing spring 36. By transmitting this shock to a solid portion of the lug 22 of the trigger-plate (or other suitable portion of the firearm) through the intermediary of the bearing-surfaces 43-43 and 45-46, distortion, jamming and breakage are obviated.

Should it be desired to remove the bolt-stopping member 44 from the firearm-structure, this may be conveniently accomplished by manually-retiring the breech-bolt 30 sufficiently to clear its forward lower corner from the upward path of movement of the upper rear corner of the head 45 of the said member 44. Now, by means of a finger, or a suitable tool if desired, inserted into the clearance-notch 41, the bolt-stopping member 44 may be raised against the tension of the spring 54 sufficiently to clear its lower end from the guide-pin 53. The lower end of the member 44 may be now rocked forwardly and the entire member removed by an upward movement thereof sufficient to clear the lower edges of its bearing-surfaces 46-46 from the bearing-surfaces 43-43 of the lug 22.

When the bolt-stopping member is removed as above described, the spring 54 will remain conveniently in place owing to the looping of its upper end over the pin 55, so that the danger of losing the said spring is minimized.

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. A firearm-structure including in combination: a receiver-unit having a substantially-vertical magazine-receiving passage and provided to the rear of and adjacent the rear wall of the said magazine-receiving passage with a rearwardly-facing bearing-surface; a breech-bolt reciprocable within the said receiver-unit and above the said bearing-surface thereof; a substantially-vertically-reciprocating bolt-stopping member mounted in the said receiver-unit mainly intermediate the rear wall of the magazine-receiving passage therein and the rearwardly-facing bearing-surface of the said receiver-unit, the said bolt-stopping member having a downwardly-opening notch adjacent its lower end and a forwardly-facing bearing-surface adjacent its upper end and located rearwardly of the main portion of said member and slidably engaging with the rearwardly-facing bearing-surface of the said receiver-unit, the said bolt-stopping member also having a rearwardly-facing portion engageable with the said breech-bolt to hold the same in its open position and also having a downwardly-facing lifting-abutment positioned to be engaged by the cartridge-follower of a magazine installed in the magazine-receiving passage of the said receiver-unit; a guide-pin extending through the downwardly-opening notch in the lower portion of the said bolt-stopping member to guide the same; and spring-means urging the said bolt-stopping member downwardly in its retired position.

2. A firearm-structure including in combination: a receiver having a downwardly-opening mechanism-receiving chamber therein; a trigger-

plate partially closing the downwardly-opening mechanism-receiving chamber in the said receiver and together with the said receiver providing a substantially-vertical magazine-receiving passage, the said trigger-plate having a lug projecting upwardly into the mechanism-receiving chamber in the said receiver with its forward face adjacent the rear of the magazine-receiving passage referred to, the said lug of the said trigger-plate being provided back of its forward face with a rearwardly-facing bearing-surface; a breech-bolt reciprocating within the mechanism-receiving chamber of the said receiver and over the top of the lug of the said trigger-plate; a substantially-vertically-reciprocating bolt-stopping member mounted in the lug of the said trigger-plate and having a downwardly-opening notch adjacent its lower end and a forwardly-facing bearing-surface adjacent its upper end

and located rearwardly of the main portion of said member and slidably engaging with the rearwardly-facing bearing-surface of the lug of the said trigger-plate, the said bolt-stopping member also having an upwardly-projecting bolt-stopping nose engageable with the said breech-bolt to hold the same in its open position and also having a downwardly-facing lifting-abutment positioned to be engaged by the cartridge-follower of a magazine installed in the magazine-receiving passage provided by the said receiver and trigger-plate; a guide-pin extending through the downwardly-opening notch in the lower portion of the said bolt-stopping member and supported in the lug of the said trigger-plate; and spring-means mounted in the lug of the said trigger-plate and urging the said bolt-stopping member downwardly into its retired position.

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