

Oct. 3, 1939.

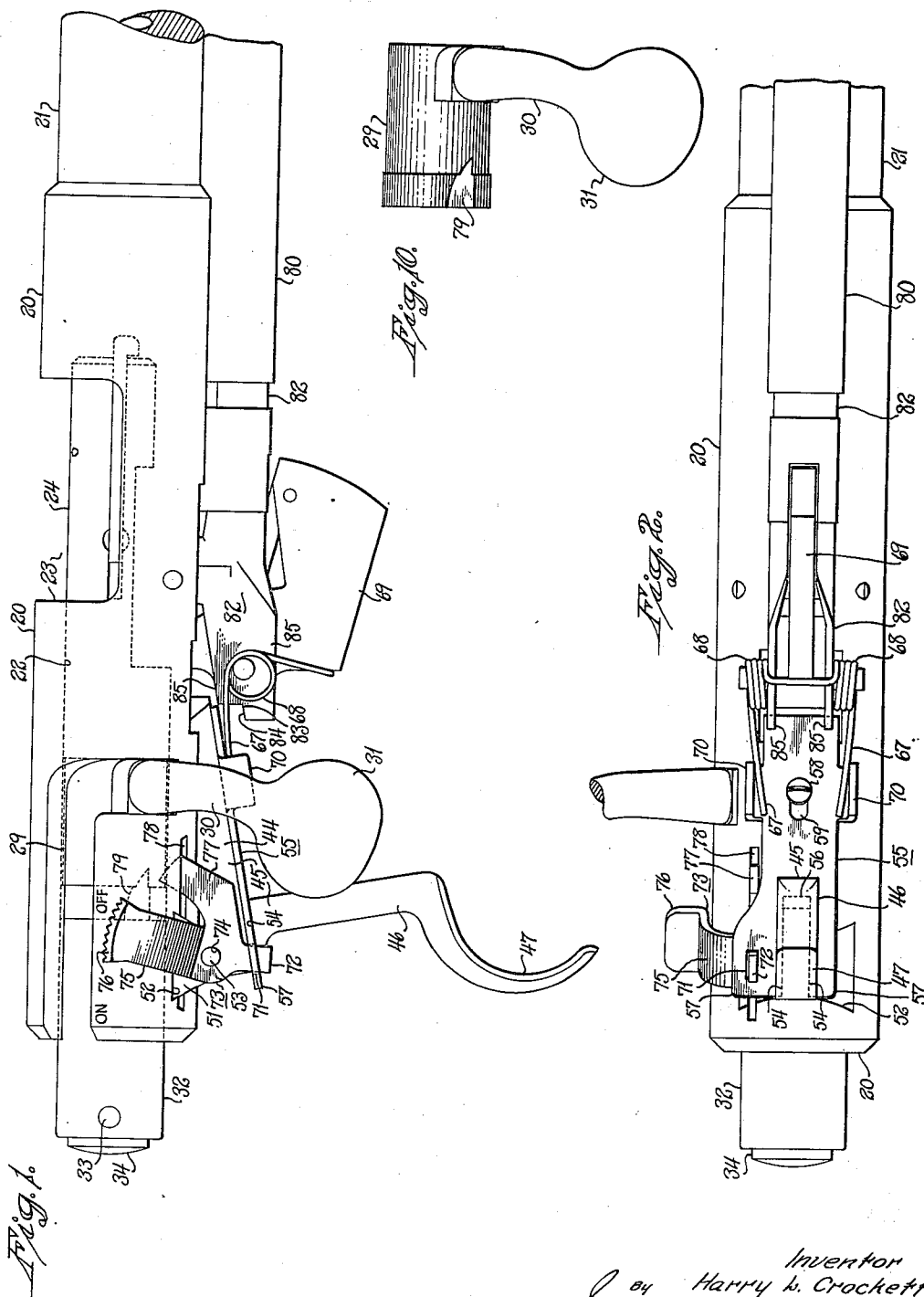
H. L. CROCKETT

2,174,971

SAFETY MECHANISM FOR FIREARMS

Filed July 19, 1937

3 Sheets-Sheet 1



Inventor
Harry L. Crockett
Seymour E. Nichols
Attorneys

Oct. 3, 1939.

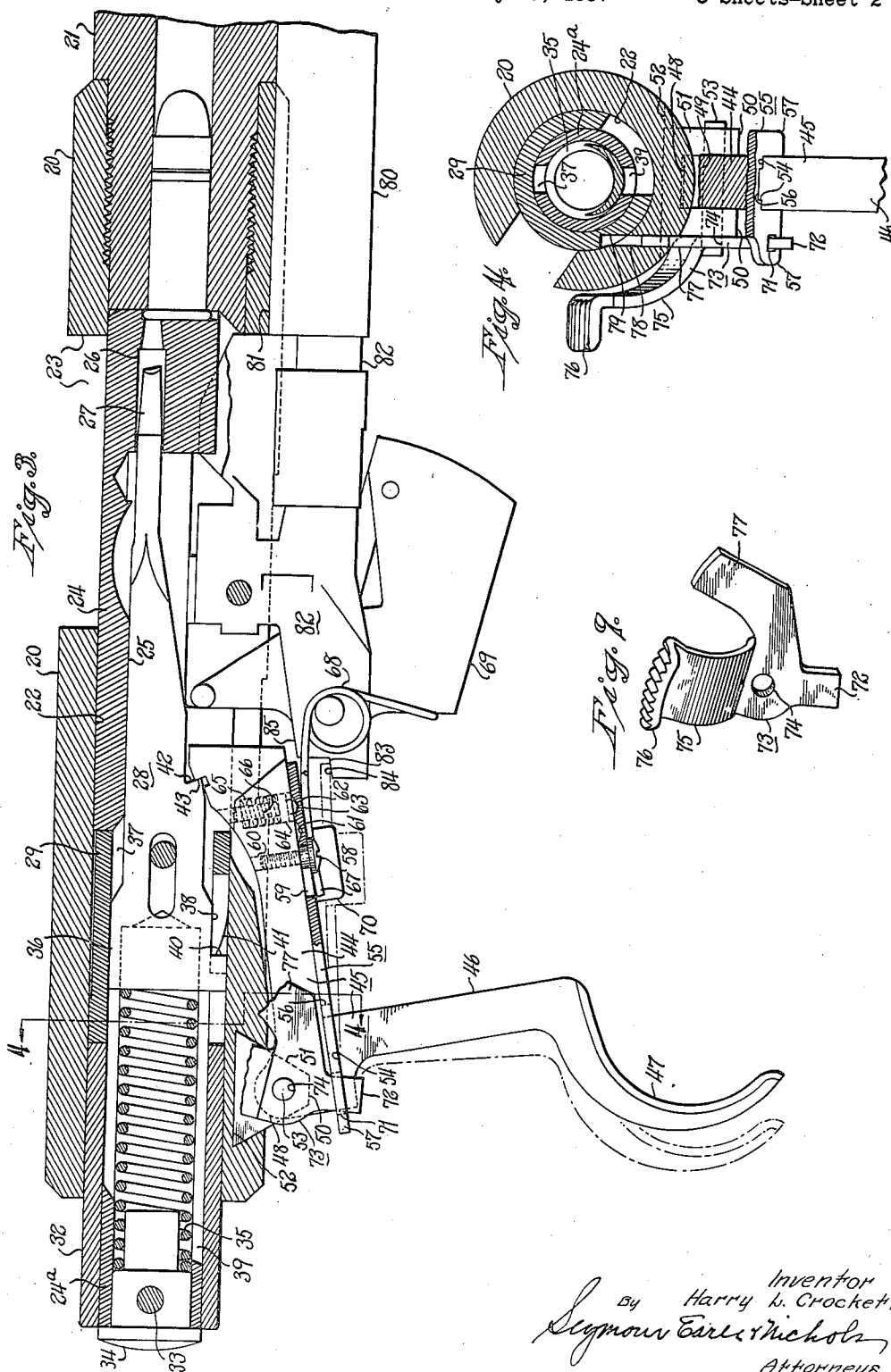
H. L. CROCKETT

2,174,971

SAFETY MECHANISM FOR FIREARMS

Filed July 19, 1937

3 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,174,971

SAFETY MECHANISM FOR FIREARMS

Harry L. Crockett, New Haven, Conn., assignor, by
mesne assignments, to Western Cartridge Com-
pany, a corporation of Delaware

Application July 19, 1937, Serial No. 154,448

10 Claims. (Cl. 42—70)

This invention relates to an improvement in safety mechanisms for firearms and particularly to manually-operable safety mechanisms by means of which the firing mechanism of firearms may be rendered ineffective or effective at the option of the user.

One of the objects of the present invention is to provide a superior safety mechanism for firearms which is simple and reliable in operation and low in cost of production.

A further object is to provide a superior safety mechanism for firearms which will remain effective over a long period of service despite appreciable wear occurring as a result of severe and continued usage.

Another object of the present invention is to provide a superior safety mechanism for firearms which will function properly despite lost motion or flexibility in the firing mechanism and associated parts.

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 by me in a separate application.

The present invention contemplates a safety mechanism for firearms in which the safety member is carried by the sear or other fire-control mechanism itself.

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 an upturn and pull-back bolt-action firearm in which the present invention is incorporated, the stock and associated parts being omitted and the safety mechanism being shown in its "off" position;

Fig. 2 is a broken underside view thereof;

Fig. 3 is a view thereof partly in side elevation but mainly in vertical central longitudinal section;

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

Fig. 5 is a view in rear end elevation of the structure shown in the preceding figures;

Fig. 6 is a view corresponding to Fig. 1 but showing the position which the parts assume when the safety mechanism is thrown into its "on" position;

Fig. 7 is a perspective view of the sear-and-trigger unit;

Fig. 8 is a similar view of the safety-slide;

Fig. 9 is a perspective view of the manually-shiftable operating-lever; and

Fig. 10 is a view in side elevation of the bolt-operating sleeve and its handle.

The safety mechanism of the present invention is suitable for use in connection with various firearm structures but the particular firearm herein chosen for illustration is of the so-called "upturn and pull-back" bolt-action type. The said firearm includes a receiver 20 of tubular form and into the forward end of which the rear end of a barrel 21 is threaded. The receiver 20 is also provided with an axial bolt-receiving passage 22, the forward upper portion of which is intersected by a loading-and-ejection opening 23.

Mounted in the bolt-receiving passage 22 of the receiver 20 with capacity for reciprocation therein is a cylindrical bolt 24 formed in its interior with an axial firing-plunger guideway 25 which is intersected at its forward end by a relatively-small eccentric firing-point passage 26. Projectable through the said passage 26 is the firing-point 27 located at the forward end of a firing-plunger 28, which latter is mounted in the passage 25 in the bolt 24 with capacity for reciprocation therein.

The rear portion 24a of the breech-bolt 24 is reduced in diameter to provide a smooth cylindrical exterior surface upon which turns a bolt-operating sleeve 29 having a laterally-offsetting handle 30 terminating in a ball-grip 31. To retain the bolt-operating sleeve 29 in place upon the reduced rear portion 24a of the bolt 24, a retaining-sleeve 32 is mounted upon the said portion 24a and in turn is secured in place by a retaining-pin 33 extending diametrically through the said retaining-sleeve 32, the portion 24a, and through an end-plug 34 inserted in the open rear end of the said portion 24a, as clearly shown in Fig. 3.

Fitted within the rear portion of the passage 25 in the reduced rear portion 24a of the breech-bolt 24 and seating at its rear end against the end-plug 34 therein, is a helical firing-spring 35 which bears at its forward end against the rear end of the firing-plunger 28, before referred to. The main portion of the firing-plunger 28 is substantially plate-like and is provided at its rear end with an upwardly-extending guide-extension 36 riding in a longitudinal groove 37 formed in the upper wall of the reduced portion 24a of the breech-bolt 24, as is shown in Figs. 3 and 4. The firing-plunger 28 is also formed at its rear end with a downwardly-extending guide-projection 38 extending through a longitudinal slot 39 in the

bottom wall of the reduced portion 24a. The said projection 38 in turn has projecting from it a downwardly-extending finger 40 which projects into engagement with a cam-slot 41 formed in the bolt-operating sleeve 29, before referred to.

The firing-plunger 28 is also formed in its under portion with a forwardly-facing cocking-shoulder 42, which is adapted to be engaged by a rearwardly-facing cocking-shoulder 43, formed upon the substantially-horizontal sear-arm 44 of a sear-and-trigger unit, which is generally designated by the reference character 45 and which includes, in addition to the said sear-arm 44, a substantially-vertical trigger-arm 46 terminating at its lower end in a curved trigger or finger-piece 47.

The sear-arm 44 and the trigger-arm 46 of the sear-and-trigger unit 45, above referred to, together form a substantially L-shaped figure which is provided adjacent its apex with a mounting-ear 48 having a transverse bearing-opening 49 therethrough. The mounting-ear 48 of the sear-and-trigger unit 45 extends upwardly between the spaced-apart depending arms 50—50 of a bracket 51 which is of wedge-shaped form in end elevation and which has its upper portion firmly seated in a transverse dovetail notch 52 formed in the under side of the receiver 20 immediately adjacent the rear end thereof. Extending through the bearing-opening 49 in the sear-and-trigger unit 45 and through the depending arms 50—50 of the bracket 51, is a pivot-pin 53 upon which the said unit 45 rocks.

Formed in each of the respective opposite sides of the sear-and-trigger unit 45 is a guide-groove 54 extending parallel with the sear-arm 44 and having its upper wall in the same plane as the under side thereof. Arranged directly beneath the sear-arm 44 of the said unit 45, is a safety-slide, generally designated by the reference character 55, the rear end of which is notched as at 56, to straddle the upper end of the trigger-arm 46 at the point where the same integrally joins the sear-arm 44. The notch 56 results in the formation upon the rear end of the safety-slide 55 of two guide-fingers 57—57, the inner edge portions of which ride in the guide-grooves 54—54 in the sear-and-trigger unit 45, as before described.

The forward portion of the safety-slide 55 is supported and guided for reciprocation beneath the sear-arm 44 by a guide-screw 58 which extends through a longitudinal slot 59 in the said safety-slide and into a threaded bore 60 in the sear-arm 44. Immediately forward of the slot 59, the safety-slide 55 is formed with two conical detent-pockets 61 and 62, which alternately register with and receive the detent-nose 63 of a detent-plunger 64 which is mounted in a downwardly-opening pocket 65 in the forward portion of the sear-arm 44. The said detent-plunger 64 is yieldingly urged downwardly into engagement with either one or the other of the two detent-pockets 61 or 62 by a helical spring 66 which is also located in the pocket 65 just referred to.

The safety-slide 55, and hence the sear-arm 44, is urged upwardly by the tension of the rearwardly-extending complementary arms 67—67 of a spring, generally designated by the reference character 68, and which also serves to upwardly swing a cartridge-carrier or elevator 69 which, in itself, is not concerned with the present invention. To prevent the arms 67—67 of the spring 68 from spreading unduly, so as to lose engagement with the under face of the safety-slide 55,

the said safety-slide is formed on each of its respective opposite sides, adjacent its forward end, with a retaining-finger 70. The spring-arms 67—67, just referred to, act to swing the sear-and-trigger unit 45 about its pivot-pin 53 in a direction required to interpose its cocking-shoulder 43 in the path of movement of the cocking-shoulder 42 of the firing-plunger 28.

The right rearwardly-projecting arm 57 of the safety-slide 55 is formed with a substantially-rectangular coupling-opening 71 which receives the depending coupling-finger 72 of a sheet-metal operating-lever, generally designated by the reference character 73. The operating-lever 73, just referred to, is provided with a bearing-opening 74 which turns upon the projecting right end of the pivot-pin 53 upon which the sear-and-trigger unit 45, before referred to, is pivotally hung. The operating-lever 73 is also formed with an upwardly-extending and slightly outwardly-bowed operating-arm 75 which is bent outwardly at its upper end to provide a finger-piece 76 having its upper surface serrated to provide an anti-slip surface for engagement by the thumb of the marksman. The operating-lever 73 is also formed, as is particularly well shown in Fig. 9, with an upwardly-projecting locking-finger 77 which is adapted on occasion to be swung upwardly through a guide-passage 78 in the receiver 20 into position to be engaged by a locking-abutment 79 formed in the exterior surface of the bolt-operating sleeve 29, in a manner as will hereinafter appear.

Extending beneath the barrel 21 in substantial parallelism therewith is a tubular magazine 80, the upper rear portion of which is accommodated in a longitudinal groove 81 formed in the under face of the forward portion of the receiver 20. Extending rearwardly from the tubular magazine 80 is a magazine-extension or throat-member 82 which is not directly concerned with the present invention other than that the rear portions of its spaced-apart side-walls are each notched as at 83 to permit the vertical play of the forward portion of the safety-slide 55, when the same is in its rearmost or "off" position. The bottom of each of the notches 83 constitutes the stop-abutment 84 against which the under face of the forward end of the safety-slide 55 engages when the trigger is pulled, to thus limit the swinging movement of the sear-and-trigger unit 45. The rear portion of the upper edge of each of the side-walls of the magazine-extension 82 constitutes a locking-abutment 85 with which the under face of the forward portion of the safety-slide 55 is adapted to engage to prevent the clockwise rocking movement of the sear-and-trigger unit 45 and thus prevent the cocking-shoulder 43 of the sear-arm 44 from being disengaged from the cocking-shoulder 42 of the firing-plunger 28, in a manner as will hereinafter appear.

When the finger-piece 76 of the operating-lever 73 is swung forwardly into the position in which it is shown in Figs. 1 to 5 inclusive, the safety-slide 55 will be drawn rearwardly so that its forward end lies to the rear of the locking-abutments 85. Under these conditions, the sear-and-trigger unit 45 is free to be rocked by means of the trigger or finger-piece 47 against the tension of the spring 68 to release the firing-plunger and thus effect the firing of the arm. When the operating-lever 73 is swung into its "off" position, as just described, its locking-finger 77 will be withdrawn from the path of movement of the

locking-abutment 79 in the bolt-operating sleeve 29, and the said operating-lever, as well as the safety-slide 55 itself, will be retained in the "off" position by the engagement of the detent-nose 63 of the detent-plunger 64 with the forward detent-pocket 62 in the upper face of the safety-slide 55.

If after the firearm is cocked it should be desired to lock the sear-and-trigger unit 45 against operation by the trigger or finger-piece 47, the finger-piece 76 of the operating-lever 73 may be swung rearwardly, with the effect of shifting the safety-slide 55 forwardly until its forward end overlies the locking-abutments 85.

When the operating-lever is swung, as just above described, its locking-finger 77 will be swung upwardly through the slot 78 in the receiver 20 and into the path of rotary movement of the locking-abutment 79 of the bolt-operating-sleeve 29. The parts will now have assumed the positions in which they are shown in Fig. 6, in which it will be noted that not only is the sear-and-trigger unit 45 locked so that the cocking-shoulder 43 of the sear-arm 44 cannot be withdrawn from the path of movement of the cocking-shoulder 42 of the firing-plunger 28, but the bolt-operating sleeve 29 is also locked against rotation so that the said sleeve cannot be turned by its ball-terminal 31 to effect the unlocking and retardation of the breech-bolt 24. "When the operating-lever 73 is swung into its "on" position to correspondingly move the safety-slide 55, both the said parts 73 and 55 will be retained in the "on" position by the engagement of the detent-nose 63 of the detent-plunger 64 with the rearmost detent-pocket 61 in the upper face of said safety-slide 55.

From the foregoing, it will be seen that by a construction and arrangement of parts such as are described and shown, the safety mechanism is rendered simple and effective, as well as low in cost for manufacture. Furthermore, by mounting the safety-slide 55 or its equivalent directly upon the firing-member releasing-mechanism, the point of engagement of the said safety-slide with its complemental locking-abutment may be so remote from the pivot-point about which the sear-and-trigger unit turns as to be very effective and not liable to be overcome by hard rearward draft upon the finger-piece 47. This latter feature, just referred to, is also advantageous in that slight inaccuracies which may develop in manufacturing, or wear which may occur from incessant use of the safety mechanism, is rendered innocuous, so to speak.

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 spring-pressed firing member; a sear-and-trigger unit for releasably holding the said firing member in its cocked position and comprising a substantially-horizontal sear-arm and a substantially-vertical trigger-arm; a locking-abutment; and a reciprocable safety-slide carried by and movable with the said sear-and-trigger unit and positioned below the said sear-arm in substantial parallelism therewith and reciproca-

ble with respect thereto into position to engage with the said locking-abutment to lock the said sear-and-trigger unit against movement into its firing-member-releasing position.

2. A firearm structure including in combination: a spring-pressed firing member; a sear-and-trigger unit for releasably holding the said firing member in its cocked position and comprising a sear and a trigger rigidly united to each other, the said sear-and-trigger unit being formed in each of its respective opposite sides with a guide-groove; a locking-abutment; and a reciprocable safety-slide having portions riding in the guide-grooves in the said sear-and-trigger unit and slidable with respect thereto into position to engage with the said locking-abutment to lock the said sear-and-trigger unit against movement into its firing-member-releasing position.

3. An upturn and pull-back bolt-action firearm structure including in combination: a breech-bolt having a rotary operation portion provided with a locking-abutment; a spring-pressed firing member carried by the said breech-bolt; manually-operable means for releasably holding the said firing member in its cocked position; a second locking-abutment; a shiftable safety member carried by and movable with the said manually-operable means and movable with respect thereto into position to engage with the said second locking-abutment to lock the said manually-operable means against movement into its firing-member-releasing position; and a manually-shiftable operating-lever operatively connected to the said safety member for moving the same and provided with a locking portion engageable with the locking-abutment of the rotary portion of the said breech-bolt to lock the said rotary portion against rotation.

4. A firearm-structure including in combination: a spring-pressed firing-member; pivot-means; a releasing-member mounted on said pivot-means to engage with and hold said firing-member in cocked position and manually operable to turn about the said pivot-means to release said firing-member; a locking-abutment provided in the firearm-structure; and a safety-member mounted on said releasing-member to move bodily therewith and slide axially of itself with respect to said releasing-member to be shifted bodily axially along a portion of the said releasing-member into position to engage with the said locking-abutment to lock the said releasing-member against movement into position to release the said firing-member.

5. A firearm-structure including in combination: a spring-pressed firing-member; pivot-means; a releasing-member mounted on said pivot-means to engage with and hold the said firing-member in cocked position and manually operable to turn about the said pivot-means to release said firing-member; a locking-abutment provided in the firearm-structure; a safety-member attached to and carried by the said releasing-member to normally turn bodily therewith about the said pivot-means of the releasing-member, the said safety-member being also shiftable along a portion of the said releasing-member into position to engage with the said locking-abutment to lock the said releasing-member against movement into position to release the said firing-member; and a pivoted manual operating-lever connected to the said safety-member to advance and retire the same.

6. A firearm-structure including in combina-

tion: a spring-pressed firing-member; pivot-means; a releasing-member mounted on said pivot-means to engage with and hold the said firing-member in cocked position and manually operable to turn about the said pivot-means to release said firing-member; a locking-abutment provided in the firearm-structure; a safety-member attached to and carried by the said releasing-member to normally turn bodily therewith about the said pivot-means of the releasing-member, the said safety-member also being shiftable along a portion of the said releasing-member into position to engage with the said locking-abutment to lock the said releasing-member against movement into position to release the said firing-member; and an operating-lever also mounted on the said pivot-means and operatively-connected to the said safety-member to shift the same.

7. A firearm-structure including in combination: a spring-pressed firing-member; pivot-means; a sear-and-trigger unit mounted on the said pivot-means including a sear-arm for engaging with and holding said firing-member in cocked position and a trigger-arm manually operable to turn said sear-and-trigger unit about its said pivot-means to release the said firing-member; a locking-abutment provided in the firearm-structure; and a safety-member mounted on said sear-arm to move bodily therewith and slide axially of itself with respect to said sear-arm to be shifted bodily axially along the sear-arm of said sear-and-trigger unit into position to engage with the said locking-abutment to lock the said sear-and-trigger unit against movement into position to release the said firing-member.

8. A firearm-structure including in combination: a spring-pressed firing-member; pivot-means; a sear-and-trigger unit mounted on the said pivot-means and including a sear-arm for engaging with and holding the said firing-member in cocked position and a trigger-arm manually operable to turn said sear-and-trigger unit about its said pivot-means to release the said firing-member; a locking-abutment provided in the firearm-structure; and a safety-member mounted on said sear-arm to move bodily therewith and slide axially of itself with respect to

said sear-arm to be shifted bodily axially of itself and substantially longitudinally of the firearm-structure into position to engage with the said locking-abutment to lock the said sear-and-trigger unit against movement into position to release the said firing-member.

9. A firearm-structure including in combination: a spring-pressed firing-member; pivot-means; a sear-and-trigger unit mounted on the said pivot-means and including a sear-arm for engaging with and holding said firing-member in cocked position and a trigger-arm manually operable to turn said sear-and-trigger unit about its said pivot-means to release the said firing-member; a locking-abutment provided in the firearm-structure; a reciprocable safety-member attached to and carried by said sear-and-trigger unit to normally turn bodily therewith about the said pivot-means of the unit, the said safety-member being also shiftable along a portion of the said sear-arm into position to engage with the said locking-abutment to lock the said sear-and-trigger unit against movement into position to release the said firing-member; and a pivoted manual operating-lever connected to the said safety-member to advance and retire the same.

10. A firearm-structure including in combination: a spring-pressed firing-member; pivot-means; a sear-and-trigger unit mounted on the said pivot-means and including a sear-arm for engaging with and holding the said firing-member in cocked position and a trigger-arm manually operable to turn the said sear-and-trigger unit about its said pivot-means to release the said firing-member; a locking-abutment provided in the firearm-structure; a reciprocable safety-member attached to and carried by the said sear-and-trigger unit to normally turn bodily therewith about the said pivot-means of the unit, the said safety-member being also shiftable along the said sear-arm into position to engage with the said locking-abutment to lock the sear-and-trigger unit against movement into position to release the said firing-member; and an operating-lever also mounted on the said pivot-means and operatively connected to the said safety-member to reciprocate the same.

HARRY L. CROCKETT.