

UNITED STATES PATENT OFFICE

2,191,521

SAFETY MECHANISM FOR FIREARMS

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Application February 1, 1937, Serial No. 123,415

18 Claims. (Cl. 42-70)

This invention relates to an improvement in firearms, and relates in particular to safety mechanism for firearms to serve to guard against the inadvertent discharge of the latter.

One of the objects of the present invention is to provide a superior safety mechanism for firearms which will guard against inadvertent firing.

Another object is to provide a superior safety mechanism for firearms which will not only guard against firing when the trigger is inadvertently pulled, but will also guard against the firing of the arm as an incident to lateral blows or shock.

A further object of the present invention is to provide a superior safety mechanism which will securely lock the firing-mechanism of a firearm against inadvertent release, but which will also permit the trigger to reassume its normal position should it be displaced therefrom while the safety mechanism is in its "on" position.

A still further object is to provide a superior safety mechanism which will not only effectively prevent the inadvertent firing of a firearm while leaving the trigger free for manipulation, but which will also permit the trigger to reassume its normal position before the safety mechanism is released.

Another object of the present invention is to provide a simple, reliable and effective safety mechanism which will lock both the sear and the bolt 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 by me in a 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 in side elevation of an upturn-and-pullback 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 view corresponding to Fig. 1 but showing the safety mechanism shifted into its "on" position;

Fig. 3 is a vertical, central, longitudinal, sectional view thereof with the parts shown in the positions which they assume when the safety mechanism is in its "off" position;

Fig. 4 is a view corresponding to Fig. 3 but showing the positions which the parts assume when the safety mechanism is thrown into its "on" position;

Fig. 5 is a transverse sectional view taken on the line 5-5 of Fig. 1;

Fig. 6 is a similar view taken on the line 6-6 of Fig. 1;

Fig. 7 is a perspective view of the sear;

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

Fig. 9 is a perspective view of the safety-lever; and

Fig. 10 is a view in side elevation of the bolt.

The safety mechanism of the present invention is suitable for use in connection with various firearm structures but the particular firearm herein chosen for illustrative purposes is of the so-called "upturn-and-pullback" bolt-action type. The said firearm includes a receiver 20 of substantially tubular form having a transverse dovetail sight-receiving groove 21 in its upper portion and having threaded into its forward end the rear end of a barrel 22 having a cartridge-chamber 23 therein. The receiver 20 is also provided with an axial bolt-receiving passage 24, the forward upper portion of which is intersected by a loading-and-ejection opening 25.

Mounted in the bolt-receiving passage 24 of the receiver 20, with capacity for reciprocation therein, is a cylindrical bolt 26 having an axial firing-pin passage 27 therein intersected at its forward end by a relatively-small eccentric passage 28. Projectable through the said passage 28 is the firing-point 29 of a firing-plunger 30 mounted in the passage 27 in the bolt 26.

The rear portion of the firing-plunger 30 is of tubular form in cross-section and provides a firing-spring chamber 31 receiving a firing-spring 32, which latter thrusts at its forward end against the front wall 33 of the firing-spring chamber 31. The rear end of the firing-spring 32 is seated against a pin 34 mounted in and extending transversely through the reduced cylindrical rear portion 35 of the bolt 26. The said pin extends through longitudinal clearance-slots 36-36 respectively formed in the rear portion of the top and bottom walls of the firing-plunger 30 so that the first firing-plunger may reciprocate independently of the bolt 26 but, at the same time, be prevented from relative rotary movement with respect thereto.

As shown, the rear end of the firing plunger 30 may be provided with a head 37 having forwardly-extending ribs 38-38 adapted to enter complementary notches 39-39 in the rear edge of a bolt-operating sleeve 40 which is mounted with capacity for turning movement upon the reduced cylindrical rear portion 35 of the bolt 26 and provided with an integral laterally-off-setting handle 41 terminating in a ball-grip 42.

Intermediate its respective opposite ends, the under-portion of the firing-plunger 30 is transversely cut away to provide a substantially-vertical forwardly-facing cocking-shoulder 43 adapted to be engaged, when the firearm is cocked, by the rear face 44 of a sear-nose 45 vertically up-

standing from a pivotal sear 46. The said sear is pivotally mounted adjacent its forward end by means of a transverse pivot-screw 47, in a vertically-extending passage 48 formed in the under side of the receiver 20. The said sear-nose 45 of the sear 46 projects upwardly for the engagement of its rear face 44 with the cocking-shoulder 43, through a longitudinal clearance-slot 49 formed in the under side of the bolt 26.

The portion of the sear 46 which is located forwardly of the pin 47 is provided with an upwardly-opening spring-pocket 50 receiving a sear-spring 51 bearing at its upper end against the under surface of the receiver 20 and exerting a constant effort to swing the said sear in a clockwise direction as viewed in the drawings to lift its sear-nose 45. The sear 46 is also formed with a vertical passage 52 receiving the upper end 53 of a trigger 54 and is provided just to the rear of the said passage 52 with a downwardly-facing trigger-engaging shoulder 55 adapted to rest, when the firearm is cocked, upon an upwardly-facing sear-engaging shoulder 56 formed upon the trigger 54 before referred to.

To limit the degree of overlap of the trigger-engaging shoulder 55 and the sear-engaging shoulder 56, the upper portion of the said trigger 54 is provided with an inclined adjusting-screw 57, the rear terminal of which is engageable with the rear wall 58 of the passage 52 in the sear 46 for the purpose just referred to.

The rear portion of the sear 46 is formed with an upwardly-opening pocket 53 receiving a sear-actuating plunger 60 having a stem 61 downwardly-extending through a bearing-passage 62 opening downwardly through the sear 46 from the lower end of the said pocket 53 therein. The stem 61 of the sear-actuating plunger 60 is encircled by a sear-actuating spring 63 housed in the pocket 59 of the sear 46 and exerting a constant effort to move the plunger 60 upwardly with respect to the sear 46, and hence tending, under certain conditions as will hereinafter appear, to depress the rear end of the said sear.

The upper terminal of the sear-actuating plunger 60 is adapted to engage, when the bolt 26 is in its closed position, with a detent-notch 64 formed in the bolt-operating sleeve 40 before referred to, as shown in Figs. 3 and 4 of the drawings. The upper end of the said plunger 60 is also adapted, when the bolt-operating handle is in its elevated position, to engage with a cam-surface 65 also formed upon the exterior surface of the bolt-operating sleeve 40. Under the conditions just described, the upward movement of the sear-actuating plunger 60 with respect to the sear 46 is limited by a stop-pin 66 extending transversely through the stem 61 of the said plunger and engageable for the purpose described with the under face of the adjacent portion of the sear 46.

The trigger 54 before described is pivoted intermediate its upper end 53 and its finger-piece 67 by means of a pivot-pin 68 extending transversely thereof and mounted at its respective opposite ends in complementary fingers 69—69 depending from a trigger-bracket 70. The said trigger-bracket has its respective opposite side walls 71—71, from which the fingers 69—69 depend, attached to the receiver 20 by means of the screw 47 upon which the sear 46 swings.

The rear wall 72 of the trigger-bracket 70 is bent to provide two rearwardly-extending ears 73 and 74. The ear 73 just referred to has extending through it a screw 75 threaded into the

under wall of the receiver 20 and serving to secure the rear end of the said trigger-bracket in place. The ear 74 just referred to of the trigger-bracket 70 mounts an internally-threaded bushing 76 receiving an adjusting-screw 77, the lower end of which engages the upper end of a trigger-spring 78, which latter has its lower end seated in a pocket 79 formed in the upper rear face of the finger-piece 67 of the trigger 54.

The mode of operation of the firing-mechanism above referred to is fully described in United States Patent No. 2,069,857, dated February 9, 1937, and requires no detailed description herein other than to say that the operation of the trigger 54 serves to permit the sear-actuating spring 63 to effect the withdrawal of the sear-nose 45 of the sear 46 out of the path of the cocking-shoulder 43 of the firing-plunger 30, to effect the discharge of the firearm.

Coming now to the safety mechanism with which the present invention is primarily concerned, the particular safety mechanism herein chosen for illustration includes a plate-like locking-member or slide 80, which is mounted with capacity for reciprocating movement axially with respect to the receiver 20 in a vertical longitudinal slot 81 formed in the lower right-side portion thereof and intersecting both the exterior thereof as well as the bolt-receiving passage 24 therein. The said locking-slide is formed in its front and rear edges respectively with guidenotches 82 and 83, through which pass transverse retaining- or guide-pins 84 and 85 mounted in the receiver 20.

The locking-slide 80 is also provided with a laterally-and-outwardly-extending coupling-stud 86 which is adapted to project through the coupling-slot 87 formed in an oscillating safety-lever 88. The said safety-lever is preferably formed of sheet-metal and has its upper end outwardly bent to provide a finger-piece 89 of arcuate form for convenient manipulation by the thumb of a marksman. The upper portion of the locking-slide 80 is accommodated in a clearance-notch 90 formed in the right side-wall of the receiver 20 and having its front and rear walls 91 and 92 respectively adapted to act as stops to limit the front and rear swinging movements respectively of the said safety-lever 88.

The end of the coupling-stud 86 of the locking-slide 80 which projects outwardly through the slot 87 in the safety-lever 88 is provided with an annular groove 93 which is adapted to cooperate with a wire-like detent-spring 94. The detent-spring, just referred to, is bent to provide a hump or peak 95 and has its forward end reversely looped around the pivot-screw 47, before referred to. The end of the detent-spring 89 opposite its portion 95 is bent inwardly as at 96, so as to rest upon the upper edge of the right side-wall 71 of the trigger-bracket 70.

Immediately below the guide-slot 83, the locking-slide 80 is formed with a horizontal slot 97 resulting in the formation of a locking-nose or abutment 98, the upper surface of which latter is adapted to have cam-like engagement, for the purpose as will hereinafter appear, with a locking-pin or abutment 99 projecting laterally from the right side of the sear 46 (Figs. 1, 2, 6 and 7).

The lower end of the safety-lever 88 is provided with an inwardly-projecting stud 100 oscillating in a bearing-opening 101 formed in the right side-wall of the trigger-bracket 70 (Figs. 5, 6 and 9).

When the safety-lever 88 is swung forwardly

into the position in which it is shown in Fig. 1, the safety-slide 80 will be similarly shifted so that the locking-nose 98 thereof is withdrawn from under the locking-pin 99 of the sear 46. Both the safety-lever 88 and the locking-slide 80 will be releasably retained in the position just described by the engagement of the forward reach of the hump 95 of the detent-spring 94 with the coupling-stud 86. Under these conditions, when the trigger 54 is pulled, the sear-engaging or -restraining shoulder 56 thereof will be withdrawn from under the trigger-engaging shoulder 55 of the sear 46, thus permitting the latter to be swung downwardly by the spring 63. This downward swinging movement of the sear 46 will disengage the sear-nose 45 from the cocking-shoulder 43 of the firing-plunger 30, to thus permit the latter to snap forwardly under the urge of the firing-spring 32 to effect the discharge of the firearm.

After the firearm has been re-cocked by first swinging the bolt-handle 41 upwardly and retiring the bolt 26, and then reversing the operations just described, in the usual manner of bolt-action firearms, the parts will reassume the positions in which they are shown in Figs. 1, 3 and 5.

If, now, the safety-lever 88 is rocked rearwardly to the position in which it is shown in Fig. 2, the locking-slide 80 will be similarly moved with the effect of causing its locking-nose 98 to cam its way under the locking-pin 99 of the sear 46, and thus slightly lift the said sear against the tension of the spring 63, until the trigger-engaging shoulder 55 of the said sear is lifted clear of the sear-engaging shoulder 56 of the trigger 54, as shown particularly well in Fig. 4.

In the event, now, that the trigger 54 should be inadvertently pulled, the sear 46 will be securely held against swinging downwardly to release the firing-pin 39 and, what is most important, the said sear will be held in such position that the trigger, when released, will be free to reposition its sear-engaging shoulder 56 beneath the now elevated trigger-engaging shoulder 55 of the said sear. Thus, should the safety-lever 88 be swung from its "on" to its "off" position after the trigger has been inadvertently pulled and released, the sear will be prevented from swinging downwardly toward its firing-member-releasing position more than enough to reengage its trigger-engaging shoulder 55 with the sear-engaging shoulder 56 of the trigger which latter shoulder will prevent the discharge of the firearm when the safety-lever 88 is moved from its "on" to its "off" position.

When the safety-slide is moved rearwardly, as above described, to cause its nose 98 to effect the lifting of the sear 46, the upper rear portion 102 of the said slide will be projected rearwardly into a locking-notch 103 formed in the periphery of the bolt-operating sleeve 40 of the bolt-handle 41. The locking-notch 103, just referred to, forms, when the bolt-handle is in its down position as shown in the accompanying drawings, a continuation of a clearance-groove 104 formed in the lower right portion of the periphery of the bolt 26.

Thus, when the locking-slide 80 is moved to its rearmost position, not only does its locking-nose 98 serve to lock the sear 46, but its upper rear portion 102, by entry into the locking-notch 103, serves to lock the bolt-handle 41 and hence the bolt 26.

It it may here be noted that when the bolt-

handle 41 is swung upwardly in the usual manner of bolt-action firearms, the locking-notch 103 in the bolt-operating sleeve 40 will be moved out of registration with the path of movement of portion 102 of the locking-slide 80, so that should the marksman inadvertently attempt to move the locking-slide into its locking position under the conditions just described, the rear edge of said locking-slide will be prevented from effective rearward movement by the engagement of its rear edge with the forward edge of the bolt-operating sleeve 40.

When the safety-lever is swung into its "on" position, as shown in Fig. 2, the rear reach of the hump 95 of the detent-spring 94 will, by engagement with the coupling-stud 86 of the safety-slide 80, serve to yieldingly hold the said slide and the said safety-lever in the positions in which they are shown in the figure referred to.

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 a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member and continuously acted on to release the same; a trigger associated with the sear to cause it to be retained in a normal firing-member-holding position and operable to release the sear; and a manually-operable safety-member having a sear-shifting portion movable to engage with and shift the sear from the said normal firing-member-holding position, and supporting the sear to temporarily replace the trigger with respect to retaining the sear in a firing-member-holding position.

2. In a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member and continuously acted on to release the same, the said sear being provided with a locking-projection; a trigger associated with the sear to cause it to be retained in a normal firing-member-holding position and operable to release the sear; and a manually-operable safety-member having a sear-shifting portion coacting with the said locking-projection and movable to engage therewith and shift the sear from the said normal firing-member-holding position, and supporting the sear to temporarily replace the trigger with respect to retaining the sear in a firing-member-holding position.

3. In a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member; spring-means continuously urging the sear to release the firing-member; a trigger associated with the sear to cause it to be retained in a normal firing-member-holding position and operable to release the sear to the action of the said spring-means; and a manually-operable safety-member having a sear-shifting portion movable to engage with and shift the sear from the said normal firing-member-holding position, and supporting the sear against the counterurge of the said spring-means to temporarily replace the trigger with respect to retaining the sear in a firing-member-holding position.

4. In a firearm the combination with a spring-

pressed firing-member; of a sear for releasably holding the firing-member and continuously acted on to release the same; a trigger associated with the sear to cause it to be retained in a normal firing-member-holding position and operable to release the sear; a locking-slide having a sear-shifting portion movable to engage with and shift the sear from the said normal firing-member-holding position, and supporting the sear to temporarily replace the trigger with respect to retaining the sear in a firing-member-holding position; and a manually-operable safety-lever operatively connected to the said locking-slide to shift the same.

5. In a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member and continuously acted on to release the same, the said sear being provided with a locking-projection; a trigger associated with the sear to cause it to be retained in a normal firing-member-holding position and operable to release the sear; a locking-slide having a sear-shifting portion coacting with the said locking projection and movable to engage therewith and shift the sear from the said normal firing-member-holding position, and supporting the sear to temporarily replace the trigger with respect to retaining the sear in a firing-member-holding position; and a manually-operable safety-lever operatively connected to the said locking-slide to shift the same.

6. In a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member; spring-means continuously urging the sear to release the firing-member; a trigger associated with the sear to cause it to be retained in a normal firing-member-holding position and operable to release the sear to the action of the said spring-means; a locking-slide having a sear-shifting portion movable to engage with and shift the sear from the said normal firing-member-holding position, and supporting the sear against the counterurge of the said spring-means to temporarily replace the trigger with respect to retaining the sear in a firing-member-holding position; and a manually-operable safety-lever operatively connected to the said locking-slide to shift the same.

7. In a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member and continuously acted on to release the same, the said sear having a trigger-engaging portion; a trigger provided with a sear-restraining portion for coacting with the said trigger-engaging portion to retain the sear in a normal firing-member-holding position, the said trigger being operable to move the sear-restraining portion thereof to release the sear; and a manually-operable safety-member having a sear-shifting portion movable to engage with and shift the sear to move its trigger-engaging portion from the sear-restraining portion of the trigger, the sear-engaging safety-member supporting the said sear to temporarily replace the trigger with respect to retaining the sear in a firing-member-holding position.

8. In a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member and continuously acted on to release the same, the said sear having a trigger-engaging portion and being also provided with a locking-projection; a trigger provided with a sear-restraining portion for coacting with the said trigger-engaging portion to retain the sear in a normal firing-member-holding position;

the said trigger being operable to move the sear-restraining portion thereof to release the sear; and a manually-operable safety-member having a sear-shifting portion coacting with the said locking-projection and movable to engage therewith and shift the sear to move its trigger-engaging portion from the sear-restraining portion of the trigger, the sear-engaging safety-member supporting the said sear to temporarily replace the trigger with respect to retaining the sear in a firing-member-holding position.

9. In a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member and continuously acted on to release the same, the said sear having a trigger-engaging portion; a trigger provided with a sear-restraining portion for coacting with the said trigger-engaging portion to retain the sear in a normal firing-member-holding position, the said trigger being operable to move the sear-restraining portion thereof to release the sear; a locking-slide having a sear-shifting portion movable to engage with and shift the sear to move its trigger-engaging portion from the sear-restraining portion of the trigger, the sear-engaging locking-slide supporting the said sear to temporarily replace the trigger with respect to retaining the sear in a firing-member-holding position; and a safety-lever operatively connected to the said locking-slide to shift the same.

10. In a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member; spring-means continuously urging the sear to release the firing-member; the said sear having a trigger-engaging portion; a trigger provided with a sear-restraining portion for coacting with the said trigger-engaging portion to retain the sear in a normal firing-member-holding position, the said trigger being operable to move the sear-restraining portion thereof to release the sear to the action of the said spring-means; a locking-slide having a sear-shifting portion movable to engage with and shift the sear to move its trigger-engaging portion from the sear-restraining portion of the trigger, the sear-engaging locking-slide supporting the said sear against the counterurge of the said spring-means to temporarily replace the trigger with respect to retaining the sear in a firing-member-holding position; and a safety-lever operatively connected to the said locking-slide to shift the same.

11. In an upturn-and-pullback bolt-action firearm, the combination with a bolt-unit having an oscillatable bolt-handle; of a spring-pressed firing-member; a sear for releasably holding the firing-member and continuously acted on to release the same; a trigger associated with the said sear to cause it to be retained in a normal firing-member-holding position and operable to release the sear; and a manually-operable safety-member carrying means for engaging a member of the bolt-unit to lock the said bolt-unit, and being also provided with a sear-shifting portion movable to engage with and shift the sear from the said normal firing-member-holding position and supporting the said sear to temporarily replace the trigger with respect to retaining the sear in its firing-member-holding position.

12. In an upturn-and-pull-back bolt-action firearm, the combination with a bolt-unit including a bolt having a bolt-handle oscillatable with respect thereto; of a spring-pressed firing-member; a sear for releasably holding the firing-member and continuously acted on to release the

same, the said sear having a trigger-engaging portion; a trigger provided with a sear-restraining portion coacting with the said trigger-engaging portion to retain the sear in a normal firing-member-holding position, the said trigger being operable to move the sear-restraining portion thereof to release the sear; and a manually-operable safety-member carrying means for engaging a member of the bolt-unit to lock the said bolt-handle, and being also provided with a sear-shifting portion movable to engage with the sear and shift its trigger-engaging portion from the sear-restraining portion of the trigger, the sear-engaging safety-member supporting the sear to temporarily replace the trigger with respect to retaining the sear in a firing-member-holding position.

13. In an upturn-and-pullback bolt-action firearm, the combination with a bolt-unit including a bolt having a bolt-handle oscillatable with respect thereto; of a spring-pressed firing-member; a sear for releasably holding the firing-member, the said sear having a trigger-engaging portion; spring-means continuously urging the sear from the firing-member to release the same, a trigger provided with a sear-restraining portion coacting with the said trigger-engaging portion to retain the sear in a normal firing-member-holding position, the said trigger being operable to move the sear-restraining portion thereof to release the sear to the action of the said spring-means; and a manually-operable safety-member carrying means for engaging a member of the bolt-unit to lock the said bolt-handle, and being also provided with a sear-shifting portion movable to engage with the sear and shift its trigger-engaging portion from the sear-restraining portion of the trigger, the sear-engaging safety-member supporting the sear against the counterurge of the said spring-means to temporarily replace the trigger with respect to retaining the sear in a firing-member-holding position.

14. In a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member and having releasing-action continuously exerted thereon to free the firing-member; a trigger coacting with the sear and having a sear-restraining position for retaining the sear in a normal firing-member-holding position against the continuously exerted releasing-action, the said trigger being separately-mounted and operable independently of the sear to free the sear to the said continuously exerted releasing-action; and a manually-operable safety-member movable to engage with and lock the sear independently of the said trigger against the said continuously exerted releasing-action; the said trigger being automatically returnable independently of the safety-member and sear to its initial sear-restraining position, and the said safety-member being also operable to release the sear for movement thereof by the said continuously exerted releasing-action to the sear-restraining position of the trigger to be retained thereat in said normal firing-member-holding position.

15. In a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member and having releasing-action continuously exerted thereon to free the firing-member, the said sear being provided with a lateral locking-projection; a trigger coacting with the sear and having a sear-restraining position for retaining the sear in a normal firing-

member-holding position against the continuously exerted releasing-action, the said trigger being separately-mounted and operable independently of the sear to free the sear to the said continuously exerted releasing-action; and a manually-operable safety-member having a sear-shifting portion coacting with the said locking-projection to engage with and lock the sear independently of the said trigger against the said continuously exerted releasing-action; the said trigger being automatically returnable independently of the safety-member and sear to its initial sear-restraining position, and the said safety-member being also operable to release the sear for movement thereof by the said continuously exerted releasing-action to the sear-restraining position of the trigger to be retained thereat in said normal firing-member-holding position.

16. In a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member and having releasing-action continuously exerted thereon; a trigger associated with the sear to cause it to be retained in a normal firing-member-holding position and operable to free the sear to the said releasing-action; and safety mechanism including a reciprocating member and a pivotal force-multiplying member, the pivotal member being operatively connected to the said reciprocating-member to shift the same into and out of locking position with respect to the sear, the said safety mechanism in sear-locking position acting against the said releasing-action exerted on the sear and temporarily replacing the trigger with respect to retaining the sear in a firing-member-holding position.

17. In a firearm the combination with a spring-pressed firing-member; of a sear for releasably holding the firing-member and having releasing-action continuously exerted thereon, the said sear being provided with a lateral locking-projection; a trigger associated with the sear to cause it to be retained in a normal firing-member-holding position and operable to free the sear to the said releasing-action; and safety mechanism including a reciprocating-member and a pivotal force-multiplying member, the pivotal member being operatively connected to the said reciprocating-member to shift the same and the said reciprocating-member coacting with the said lateral locking-projection to lock and unlock the sear, the said safety-mechanism in sear-locking position acting against the said releasing-action exerted on the sear and temporarily replacing the trigger with respect to retaining the sear in a firing-member-holding position.

18. In an upturn-and-pullback bolt-action firearm, the combination with a bolt-unit having an oscillatable bolt-handle; of a spring-pressed firing-member; a sear for releasably holding the firing-member; spring-means continuously urging the sear to release the firing-member; a trigger associated with the sear to cause it to be retained in a normal firing-member-holding position and operable to release the sear to the action of the said spring-means; and a manually-operable safety-member carrying means for engaging a member of the bolt-unit to lock the said bolt-unit, the said safety-member being also provided with a sear-shifting portion for shifting the sear from the said normal firing-member-holding position and supporting the sear against the counterurge of the said spring-means to retain the sear in a firing-member-holding position.

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Feb. 27, 1940.

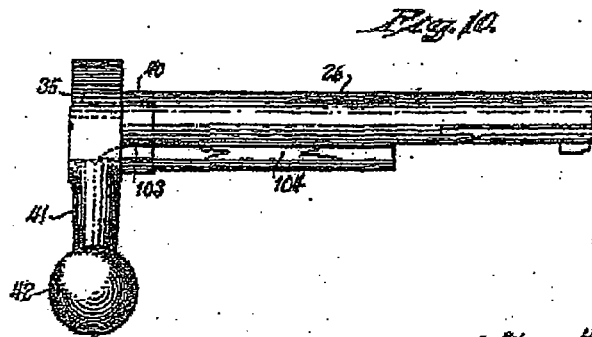
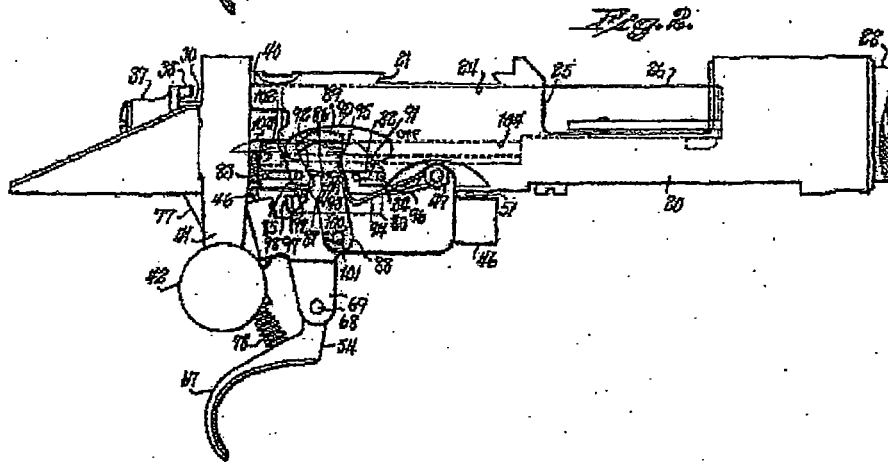
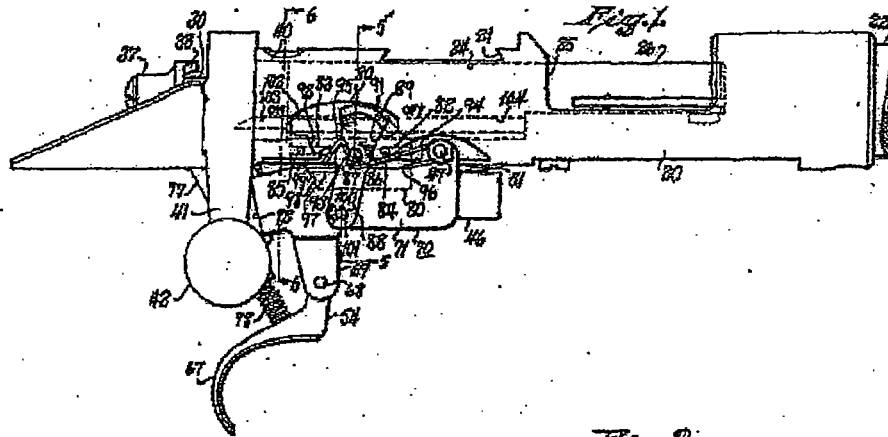
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Filed Feb. 1, 1937

3 Sheets-Sheet 1



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Feb. 27, 1940.

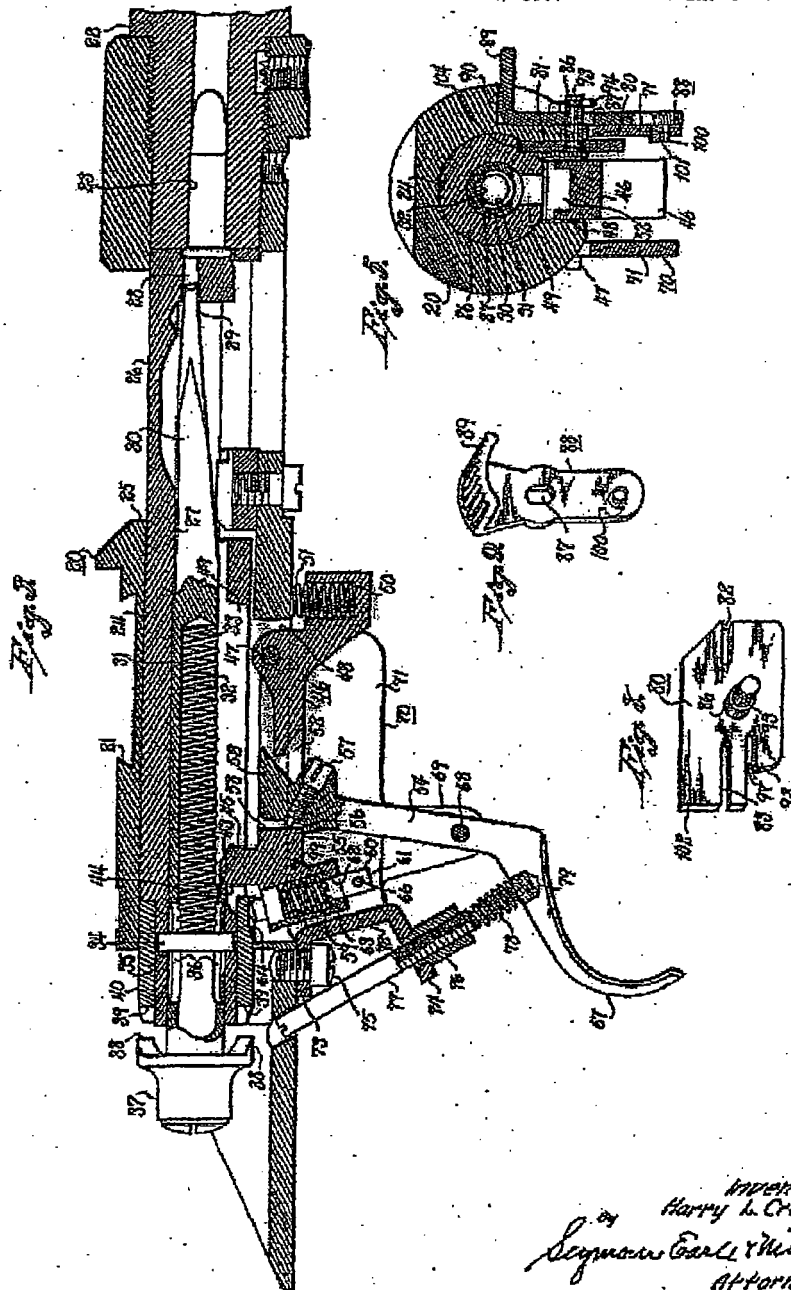
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SAFETY MECHANISM FOR FIREARMS

Filed Feb. 1, 1937

3 Sheets-Sheet 2



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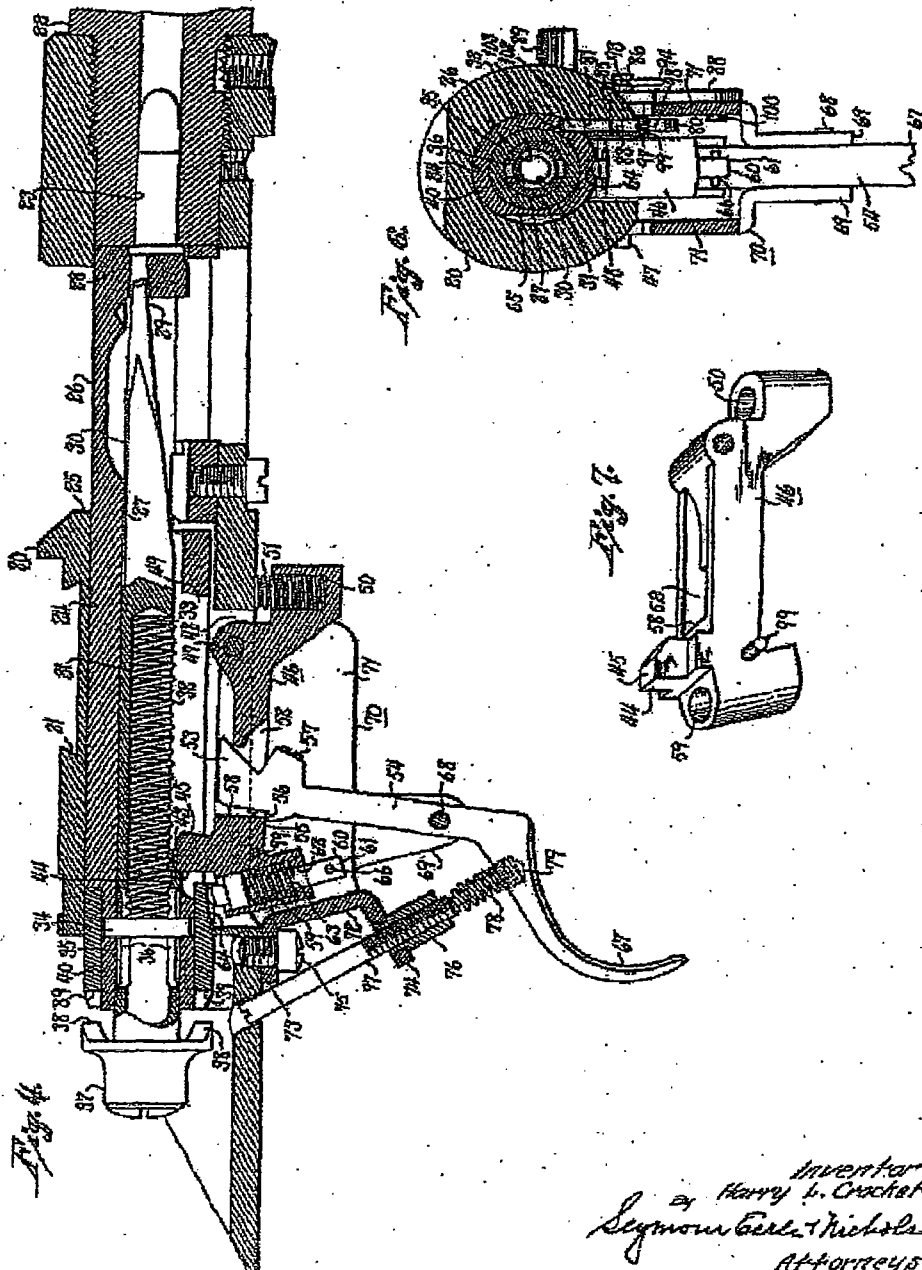
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3 Sheets-Sheet 3



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standing from a pivotal sear 45. The said sear is pivotally mounted adjacent its forward end by means of a transverse pivot-screw 47, in a vertically-extending passage 48 formed in the under side of the receiver 20. The said sear-nose 45 of the sear 46 projects upwardly for the engagement of its rear face 44 with the cocking-shoulder 43, through a longitudinal clearance-slot 49 formed in the under side of the bolt 26.

The portion of the sear 46 which is located forwardly of the pin 47 is provided with an upwardly-opening spring-pocket 50 receiving a sear-spring 51 bearing at its upper end against the under surface of the receiver 20 and exerting a constant effort to swing the said sear in a clockwise direction as viewed in the drawings to lift its sear-nose 45. The sear 46 is also formed with a vertical passage 52 receiving the upper end 53 of a trigger 54 and is provided just to the rear of the said passage 52 with a downwardly-facing trigger-engaging shoulder 55 adapted to rest, when the firearm is cocked, upon an upwardly-facing sear-engaging shoulder 56 formed upon the trigger 54 before referred to.

To limit the degree of overlap of the trigger-engaging shoulder 55 and the sear-engaging shoulder 56, the upper portion of the said trigger 54 is provided with an inclined adjusting-screw 57, the rear terminal of which is engageable with the rear wall 58 of the passage 52 in the sear 46 for the purpose just referred to.

The rear portion of the sear 46 is formed with an upwardly-opening pocket 59 receiving a sear-actuating plunger 60 having a stem 61 downwardly-extending through a bearing-passage 62 opening downwardly through the sear 46 from the lower end of the said pocket 59 therein. The stem 61 of the sear-actuating plunger 60 is encircled by a sear-actuating spring 63 housed in the pocket 59 of the sear 46 and exerting a constant effort to move the plunger 60 upwardly with respect to the sear 46, and hence tending, under certain conditions as will hereinafter appear, to depress the rear end of the said sear.

The upper terminal of the sear-actuating plunger 60 is adapted to engage, when the bolt 26 is in its closed position, with a detent-notch 64 formed in the bolt-operating sleeve 49 before referred to, as shown in Figs. 3 and 4 of the drawings. The upper end of the said plunger 60 is also adapted, when the bolt-operating handle is in its elevated position, to engage with a cam-surface 65 also formed upon the exterior surface of the bolt-operating sleeve 46. Under the conditions just described, the upward movement of the sear-actuating plunger 60 with respect to the sear 46 is limited by a stop-pin 66 extending transversely through the stem 61 of the said plunger and engageable for the purpose described with the under face of the adjacent portion of the sear 46.

The trigger 54 before described is pivoted intermediate its upper end 53 and its finger-piece 67 by means of a pivot-pin 68 extending transversely thereof and mounted at its respective opposite ends in complementary fingers 69-69 depending from a trigger-bracket 70. The said trigger-bracket has its respective opposite side walls 71-71, from which the fingers 69-69 depend, attached to the receiver 20 by means of the screw 47 upon which the sear 46 swings.

The rear wall 72 of the trigger-bracket 70 is bent to provide two rearwardly-extending ears 73 and 74. The ear 73 just referred to has extending through it a screw 75 threaded into the

under wall of the receiver 20 and serving to secure the rear end of the said trigger-bracket in place. The ear 74 just referred to of the trigger-bracket 70 mounts an internally-threaded bushing 76 receiving an adjusting-screw 77, the lower end of which engages the upper end of a trigger-spring 78, which latter has its lower end seated in a pocket 79 formed in the upper rear face of the finger-piece 67 of the trigger 54.

The mode of operation of the firing-mechanism above referred to is fully described in United States Patent No. 2,059,827, dated February 27, 1937, and requires no detailed description herein other than to say that the operation of the trigger 54 serves to permit the sear-actuating spring 63 to effect the withdrawal of the sear-nose 45 of the sear 46 out of the path of the cocking-shoulder 43 of the firing-plunger 38, to effect the discharge of the firearm.

Coming now to the safety mechanism with which the present invention is primarily concerned, the particular safety mechanism herein chosen for illustration includes a plate-like locking-member or slide 80, which is mounted with capacity for reciprocating movement axially with respect to the receiver 20 in a vertical longitudinal slot 81 formed in the lower right-side portion thereof and intersecting both the exterior thereof as well as the bolt-receiving passage 24 therein. The said locking-slide is formed in its front and rear edges respectively with guide-notches 82 and 83, through which pass transverse retaining- or guide-pins 84 and 85 mounted in the receiver 20.

The locking-slide 80 is also provided with a laterally-and-outwardly-extending coupling-stud 86 which is adapted to project through the coupling-slot 87 formed in an oscillating safety-lever 88. The said safety-lever is preferably formed of sheet-metal and has its upper end outwardly bent to provide a finger-piece 89 of arcuate form for convenient manipulation by the thumb of a marksman. The upper portion of the locking-slide 80 is accommodated in a clearance-notch 90 formed in the right side-wall of the receiver 20 and having its front and rear walls 91 and 92 respectively adapted to act as stops to limit the front and rear swinging movements respectively of the said safety-lever 88.

The end of the coupling-stud 86 of the locking-slide 80 which projects outwardly through the slot 87 in the safety-lever 88 is provided with an annular groove 93 which is adapted to cooperate with a wire-like detent-spring 94. The detent-spring, just referred to, is bent to provide a hump or peak 95 and has its forward end reversely looped around the pivot-screw 47, before referred to. The end of the detent-spring 94 opposite its portion 95 is bent inwardly as at 96, so as to rest upon the upper edge of the right side-wall 71 of the trigger-bracket 70.

Immediately below the guide-slot 83, the locking-slide 80 is formed with a horizontal slot 97 resulting in the formation of a locking-nose or abutment 98, the upper surface of which latter is adapted to have cam-like engagement, for the purpose as will hereinafter appear, with a locking-pin or abutment 99 projecting laterally from the right side of the sear 46 (Figs. 1, 2, 6 and 7).

The lower end of the safety-lever 88 is provided with an inwardly-projecting stud 100 oscillating in a bearing-opening 101 formed in the right side-wall of the trigger-bracket 70 (Figs. 5, 6 and 9).

When the safety-lever 88 is swung forwardly 75