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- [54] SAFETY MECHANISM FOR A FIREARM
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- [58] Field of Search ..... 42/70 F, 70 R, 69 A
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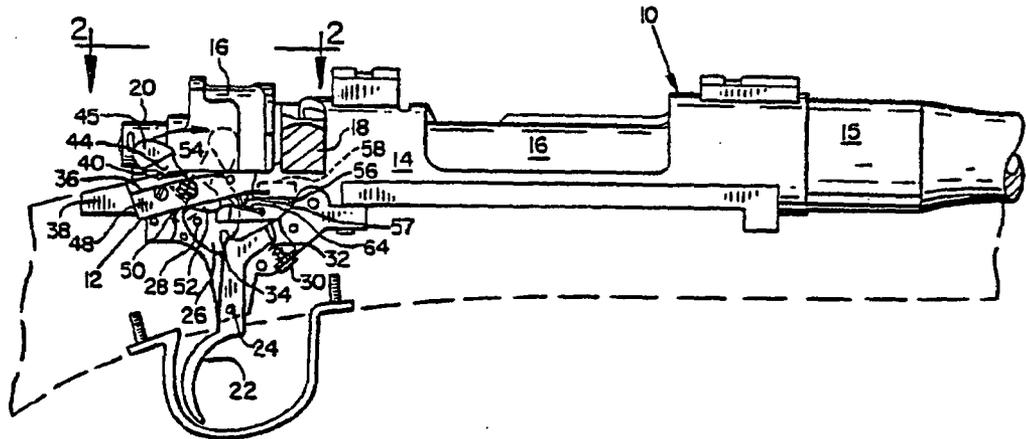
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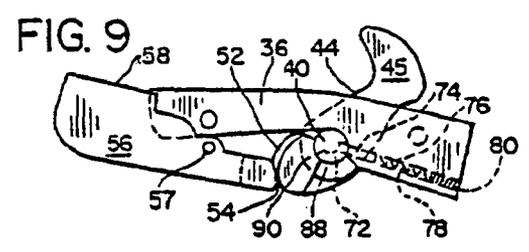
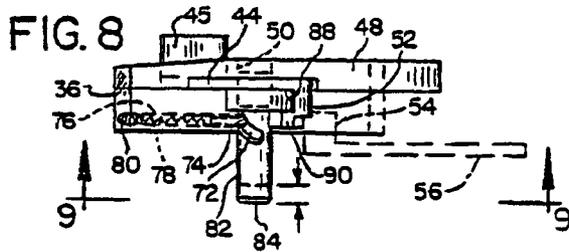
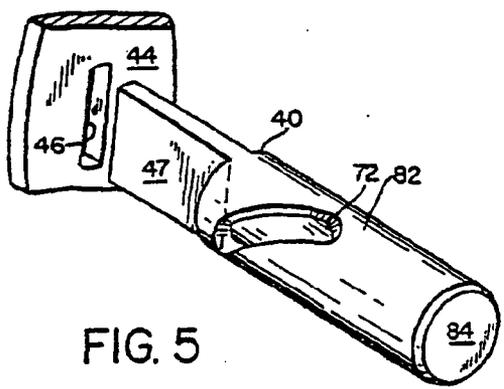
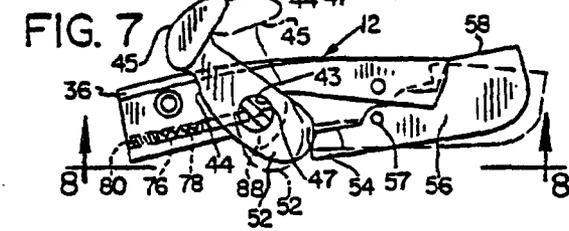
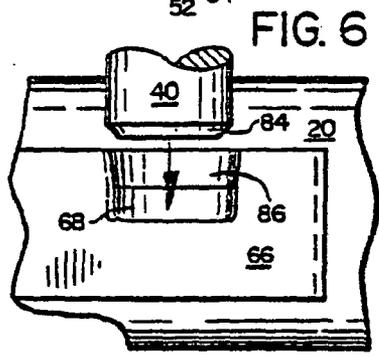
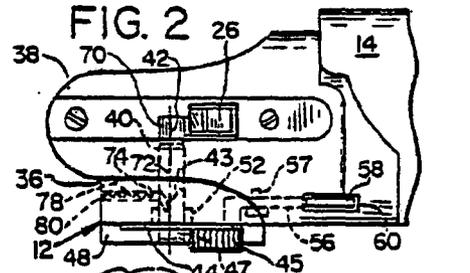
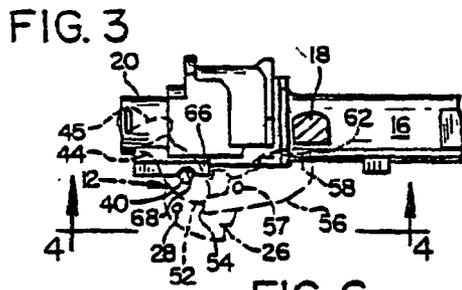
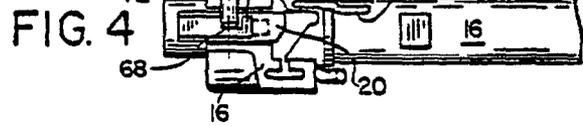
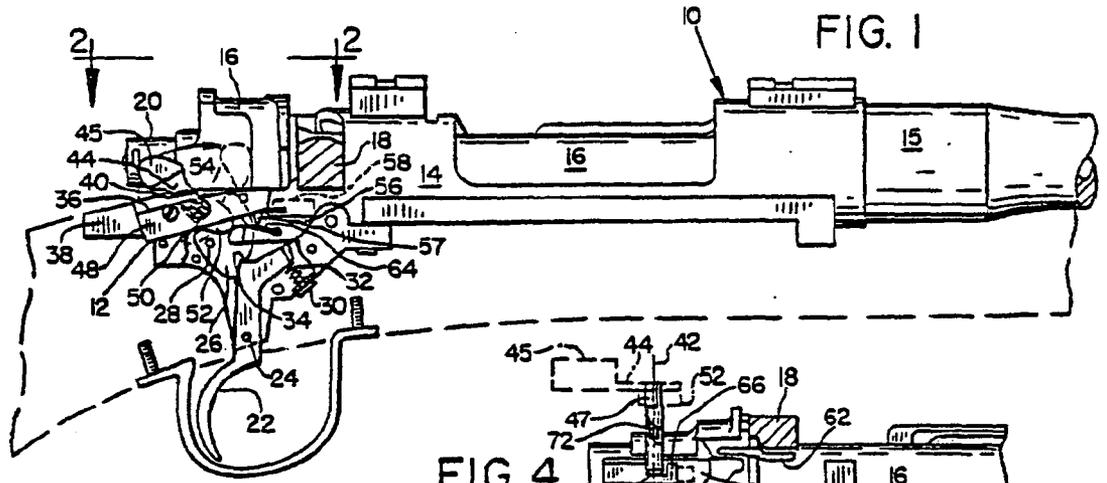
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[57] ABSTRACT

A safety device for a bolt action firearm has a laterally extending lock pin which is movable laterally to engage a recess in the cocking lug of the striker to prevent the striker from moving forward despite sear release by the trigger mechanism. An operating lever is movable rearward from a forward position in which the firearm may be discharged, rotating a helical cam which moves the lock pin laterally into the recess in the cocking lug. When the lever is moved further rearward, a cam on the operating lever pivots a blade upward into a groove in the bolt to prevent rotation of the bolt.

13 Claims, 9 Drawing Figures





## SAFETY MECHANISM FOR A FIREARM

## BACKGROUND OF THE INVENTION

The present invention relates to improvements in firearms and particularly to an improved safety mechanism for bolt action firearms.

A long-standing problem in bolt action firearms is that when the bolt is rotated to the unlocked position in opening the breech, the firearm may accidentally discharge a cartridge contained in its chamber. This occurs because many safety mechanisms for bolt action firearms must be placed in an "off-safe," or firing, position to permit the bolt to be raised from its closed and locked position.

Particularly when firearms have been designed or modified for hunting use, the trigger mechanism is often adjusted to require only a very small amount of movement to release the striker which propels the firing pin into the primer of the cartridge. While in most military rifles an appreciable amount of slack in the trigger mechanism must be taken up before the striker is released, such firearms when modified for hunting use ordinarily do not have such slack in the trigger mechanism, and are subject to accidental discharge as a result.

Some bolt action firearms employ a safety mechanism attached to the rear end of the breech bolt. Typically, a knob or small lever of such a safety mechanism must be moved to engage or disengage the safety, a movement requiring the shooter to release his grip on the stock of the firearm.

Most previously known safety mechanisms for bolt action firearms are either of the bolt mounted type just described, or else operate by blocking a portion of the trigger or sear mechanism, preventing the trigger from being moved sufficiently for the sear to release the striker. Because of the short distance which the trigger must move to discharge a cartridge in a firearm designed for hunting use, however, even a small amount of wear in a safety mechanism of this type may be sufficient to allow an accidental discharge of the firearm, upon rotation of the bolt to open the breech, or should the trigger snap on an object as the firearm is being carried.

Customarily, in the case of known firearms which are provided with a lock for securing the bolt against rotation, the bolt lock is coupled with the safety mechanism in such a way that when the safety mechanism is set on "safe," the bolt is prevented from opening. In such firearms, then, the bolt and firing mechanism are both locked or else both capable of actuation. As a result, there is a definite uncertainty while handling the firearm, because a shot can be accidentally discharged as the bolt is rotated.

What is needed, therefore, is a safety mechanism for a bolt action firearm which can secure the bolt in its locked position, preventing opening of the bolt and also preventing actuation of the firearm, and which selectively permits rotation of the bolt from its locked position while still preventing discharge of a cartridge. Additionally, such a safety mechanism should be handily operable by the shooter without the need to remove his hand from its normal position on the stock of the firearm.

## SUMMARY OF THE INVENTION

The present invention overcomes the aforementioned shortcomings and disadvantages of previously known

safety mechanisms by providing a three-position safety mechanism mounted on the tang of the receiver of the bolt action firearm, where it is thumb-operable. In one "safe" position the safety mechanism of the present invention prevents discharge of the firearm and also prevents rotation of the bolt, while in another "safe" position it prevents discharge of the firearm, yet allows rotation of the bolt from its closed-and-locked position to a position in which the safety mechanism of the firearm prevents the firearm from discharging the cartridge. In a third, or "off-safe" position the safety mechanism permits discharge of the weapon.

It is therefore a primary objective of the present invention to provide an improved safety mechanism for use in bolt action firearms.

It is another important objective of the present invention to provide a safety mechanism for bolt action firearms which cannot be overcome by pulling the trigger of such firearm.

It is yet another important objective of the present invention to provide a safety mechanism which prevents discharge of the firearm independently of the trigger and sear mechanism.

It is yet a further objective of the present invention to provide a safety mechanism which prevents inadvertent rotation of the breech bolt of a bolt action firearm.

It is a still further objective of the present invention to provide a safety mechanism which is operable without the need for the shooter to move his hand from its normal position gripping the stock of the firearm.

The present invention provides a thumb-operated three-position safety mechanism which is located conveniently on the tang of the receiver portion of the firearm. It is applicable to nearly any bolt action firearm having a striker located at the rear of the bolt, and having a cocking lug for engaging the sear mechanism on the bottom of the striker.

The safety mechanism of the invention comprises a lock pin which extends laterally toward the striker through a bore provided in the tang of the receiver, and which is laterally movable by action of a cam to engage and hold the striker, preventing discharge of the firearm. Another cam is used to move a blade into a groove in the breech bolt of the firearm to secure the bolt in a closed position.

In a preferred embodiment, one end of the lock pin fits into an opening in a safety mechanism operating lever which extends upward from the tang of the receiver to a position where a shooter can easily move the lever with his thumb. Movement of the lever forward or rearward rotates the lock pin, and a helical cam groove included in the lock pin moves it laterally of the firearm as it is rotated. When the firearm is cocked, the lock pin can be moved in this manner into a recess which is provided in the cocking lug. As the lock pin extends into the recess in the cocking lug, it engages a conical inner surface of the recess in the cocking lug, forcing the cocking lug, and thereby also the striker, to move a slight distance rearward within the receiver. With the lock pin engaged in the recess in the cocking lug, the sear lever is free to move away from and to return to its position locking the cocking lug, allowing operation of the trigger mechanism while the safety mechanism is in one of the two "safe" positions. The lock pin of the safety mechanism of the present invention thus holds the striker securely in a rearward position independently of the trigger mechanism, prevent-

ing discharge of the firearm despite operation of the trigger mechanism and despite jarring which might otherwise cause an accidental discharge.

Further movement of the operating lever of the safety mechanism, in the direction required to engage the lock pin in the recess of the cocking lug, moves a cam attached to the operating lever into contact with a follower located on one end of a blade which is pivotably mounted on the receiver of the firearm. The cam pivots the blade about an axis generally perpendicular to the blade, raising an edge of the blade through a slot provided in the receiver of the firearm into a groove provided in the bolt of the firearm, thereby preventing the bolt from rotating away from its closed-and-locked position closing the breech.

It is, therefore, a principal feature of the invention that it includes a laterally-extending lock pin which is movable laterally into locking engagement in a recess provided in a part of the striker of a bolt action firearm, to positively engage and retain the striker, preventing discharge of the firearm.

It is another important feature of safety mechanism of the present invention that the lock pin positively moves the striker rearward in the receiver of the firearm as the lock pin moves into the recess provided in the cocking lug.

It is another important feature of the present invention that when the operating lever of the safety mechanism is in an intermediate position, the bolt may be rotated, but the cocking lug is held securely, preventing discharge of the firearm.

It is a primary advantage of the present invention that it provides greater safety than previously known safety mechanisms for bolt action firearms, since it locks the striker independently of the trigger mechanism of the firearm.

It is another primary advantage of the present invention that it is more convenient to operate than a bolt-mounted safety mechanism.

It is a further advantage of the present invention that it is less susceptible to wear than safety mechanisms which depend upon lockage of the trigger mechanism, particularly in firearms requiring only a slight movement of the trigger to discharge the firearm.

The foregoing and other objectives, features and advantages of the present invention will be more readily understood upon consideration of the following detailed description of the invention taken in conjunction with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary partially cut away side elevational view of a rifle including an exemplary safety mechanism embodying the present invention.

FIG. 2 is a top view of the rear portion of the receiver of the rifle shown in FIG. 1, with the bolt removed.

FIG. 3 is a partially sectional side elevational view of a portion of the bolt of the rifle shown in FIG. 1, showing the lock pin and the blade of the safety mechanism shown in FIG. 1 engaged therein.

FIG. 4 is a bottom view, taken along line 4-4 of FIG. 3, of a portion of the bolt shown in FIG. 3, with the lock pin of the safety mechanism of the invention engaged therein.

FIG. 5 is a pictorial view, at an enlarged scale, of the lock pin of the safety mechanism shown in FIG. 1.

FIG. 6 is a bottom view, at an enlarged scale, of a detail of the bolt of the rifle shown in FIG. 1, showing

the relationship between the lock pin of the safety mechanism and the cocking lug of the bolt.

FIG. 7 is a right side elevational view, at an enlarged scale, of the safety mechanism shown in FIG. 1.

FIG. 8 is a bottom view of the safety mechanism shown in FIG. 1, taken along line 8-8 of FIG. 7.

FIG. 9 is a left side elevational view of the safety mechanism shown in FIG. 1, taken along line 9-9 of FIG. 8.

#### DETAILED DESCRIPTION OF THE INVENTION

A bolt action rifle 10, equipped with a safety mechanism 12 which is a preferred embodiment of the present invention, is shown in FIG. 1. The rifle 10 comprises a receiver 14 having a barrel 15 attached at its forward end. A breech bolt 16 is operatively mounted in the receiver 14 to block the breech of the barrel 15. A bolt handle 18 of the breech bolt 16 is shown (partially cut away for clarity) in a forward-and-down, closed-and-locked position, and a striker 20 carried by the bolt 16, is in its cocked position, in which it is held rearward with respect to the bolt 16 against the force of a striker spring (not shown).

The trigger mechanism of the rifle comprises a trigger 22, pivotably mounted on a trigger pivot pin 24, and a sear lever 26 mounted on a sear pivot pin 28. A forward end of the trigger 22 is supported by a trigger adjusting screw 30 and a trigger spring 32, while a sear 34 is provided on an upper portion of the trigger 22 to releasably hold the sear lever 26 in a position interfering with the forward movement of the striker 20 when the firearm is cocked.

Referring now also to FIGS. 2-5, the safety mechanism of the present invention may be seen to comprise a backing piece 36 fitted against one side of the tang 38 of the receiver 14 of the rifle 10, and a lock pin 40, having a longitudinal axis 42, which extends laterally through a bore 43 defined in the backing piece 36 and the tang 38 of the receiver 14. An operating lever 44 extends upward above the backing piece 38 and has a head 45 shaped to be conveniently moved by thumb pressure. An elongated opening 46, through which an outer end portion 47 of the lock pin 40 extends, is defined in the operating lever 44. A cover plate 48 is secured to the backing piece to limit movement of the operating lever 44, while a hole 50 defined in the cover plate 48 and located in alignment with the elongated opening 46 permits the lock pin 40 to move laterally and also permits observation of the position of the lock pin 40: The operating lever 44 may be moved forward, rotating about a pivot axis coincident with the central longitudinal axis 42 of the lock pin 40, from the position shown in solid line in FIG. 1, in which the safety mechanism of the invention is in a "safe" position, to the "off-safe" position shown in broken line, which permits the rifle 10 to be discharged.

A cam 52, is located on the lower portion of the operating lever 44, where it engages a follower 54 connected to a blade 56. The blade 56 is pivotably secured to the receiver 14 by, for example, a blade mounting screw 57 extending laterally through the blade into the receiver 14. An edge 58 of the blade 56 extends upward through a slot 60 in the receiver, engaging a groove 62 defined in the bottom of the bolt 16, near the bolt handle 18, preventing the bolt 16 from rotating out of its forward-and-down locked position. A blade spring 64 normally retains the edge 58 in a lowered position,