United States Patent [19]

Fox

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[54] **LOCK MEANS FOR A FIREARM**

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[52] **U.S. Cl.**.....**42/70 D,** 42/1 R, 42/70 R
[51] **Int. Cl.**.....**F41c 17/08**
[58] **Field of Search**.....42/70 D, 70 R, 1 R

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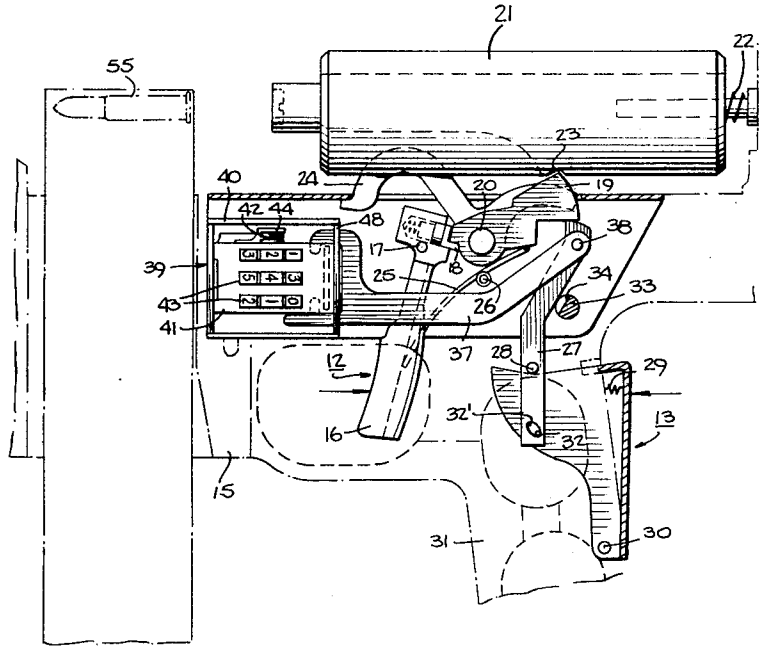
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[57] **ABSTRACT**

The lock slide is hinged to the safety bar and the combination lock is used to lock the lock slide against movement so as to prevent movement of the safety bar. This prevents the sear from pivoting away from the bolt. Upon release of the lock slide, the safety bar is free to be moved upon actuation of the grip safety if the thumb safety is off.

14 Claims, 5 Drawing Figures



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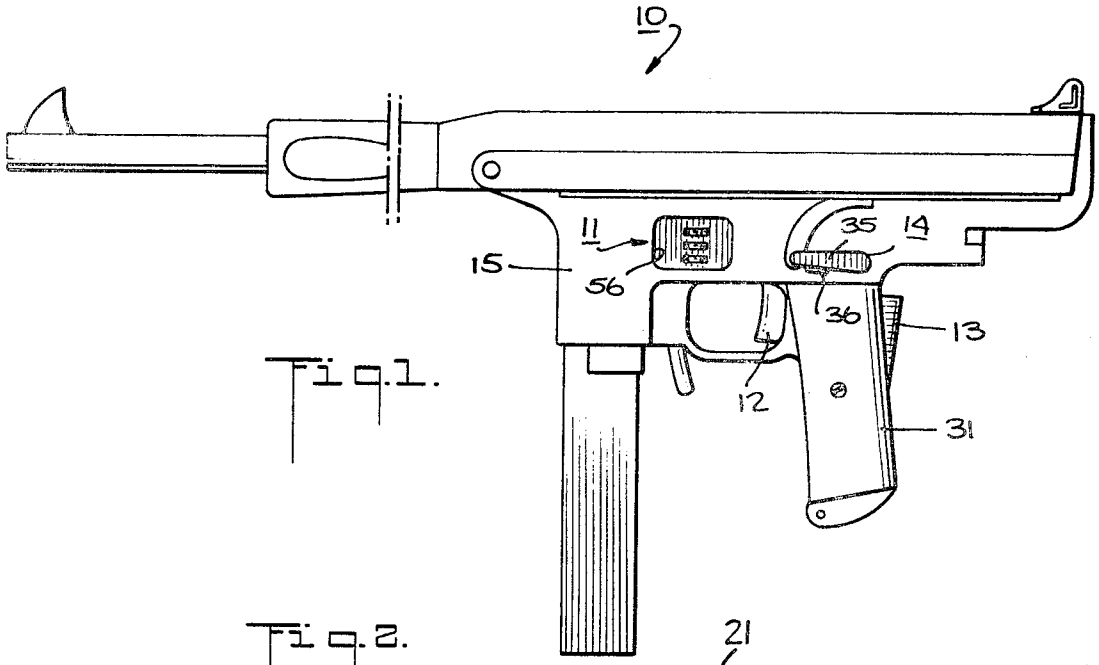
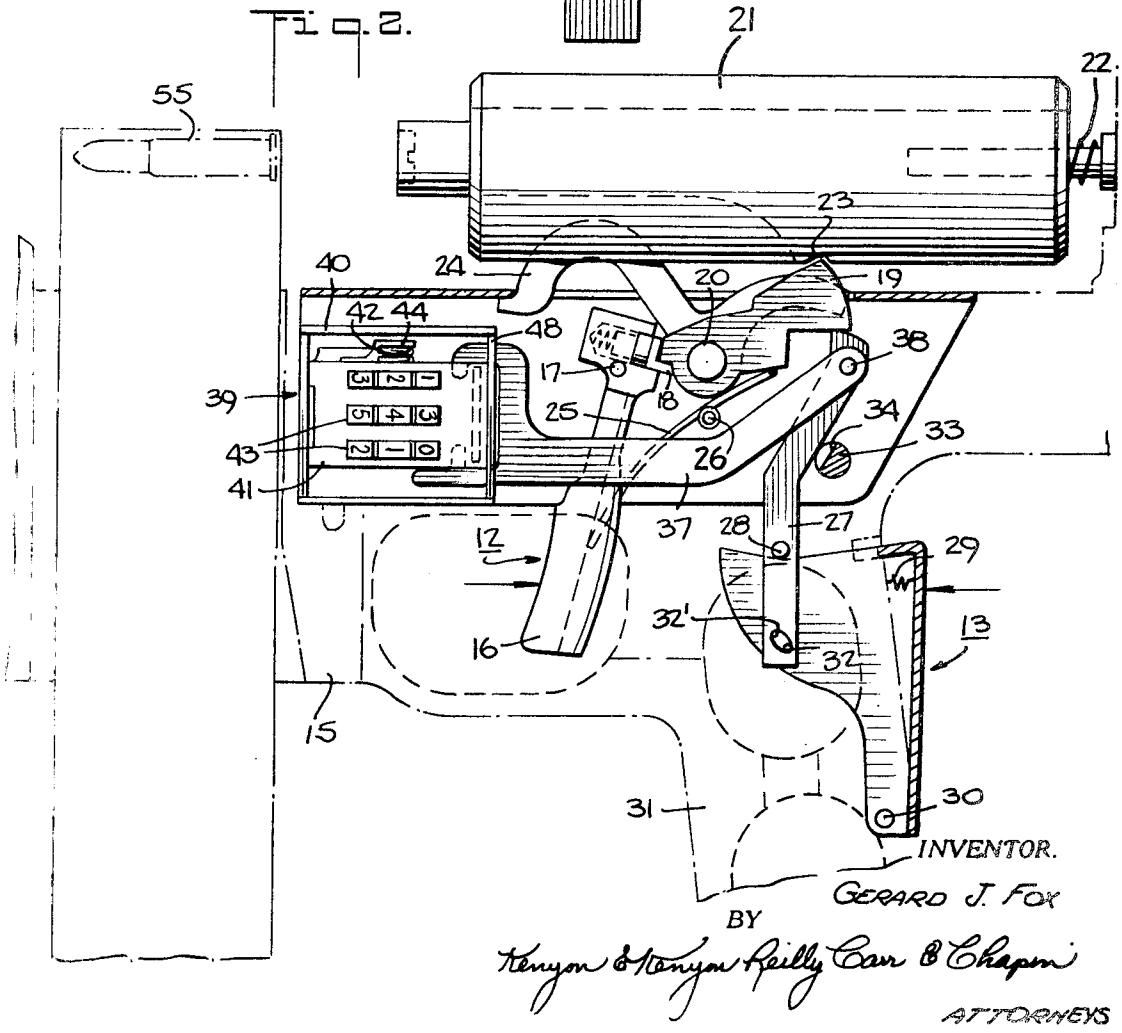


Fig. 1.

Fig. 2.



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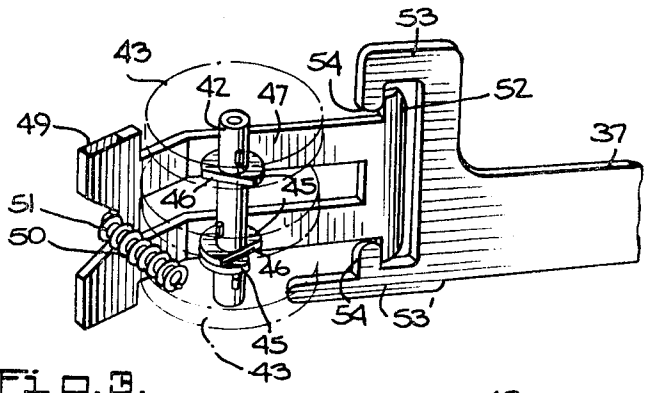


Fig. 3.

Fig. 4.

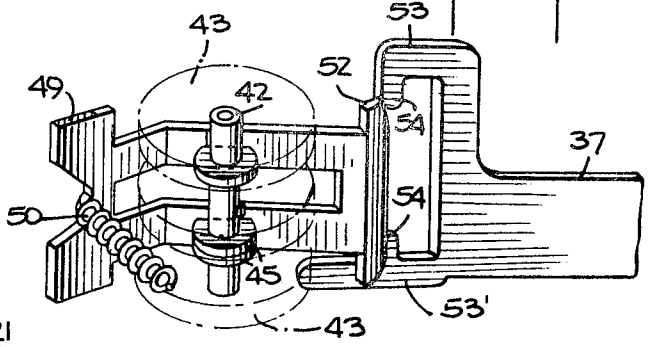
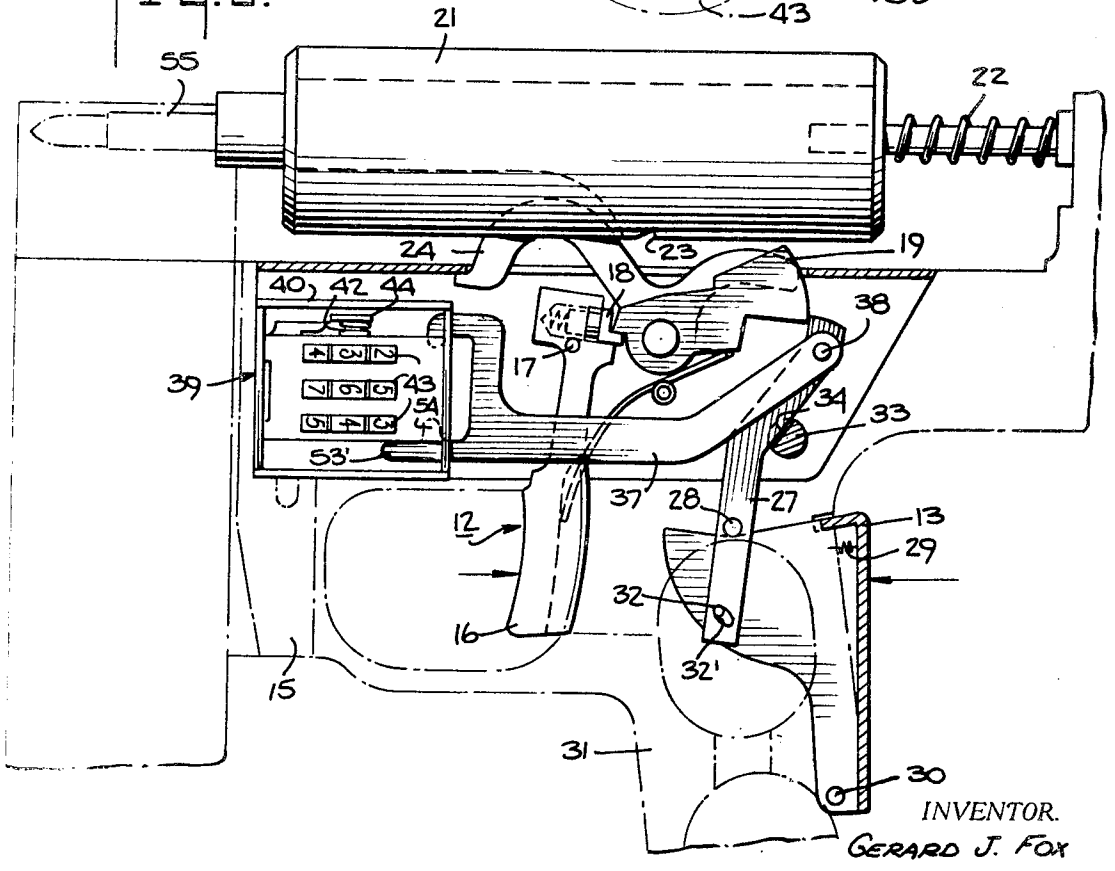


Fig. 5.



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LOCK MEANS FOR A FIREARM

This invention relates to a lock means for a firearm. More particularly, this invention relates to a lock means for preventing movement of a sear from a bolt of a firearm.

Heretofore, various types of safety locks and devices have been used to prevent the inadvertant firing of a firearm. Generally, these devices have included a safety bar which has been mounted in the path of a sear so as to prevent movement of the sear and thus release of the bolt of the firearm. The safety bar, in turn, has been held in place by a grip safety and/or a thumb safety. Once these grip and thumb safeties have been released, the safety bar is freed for movement out of the path of the sear so that a trigger mechanism can withdraw the sear from the bolt and cause discharging of the firearm.

While these safety devices have been generally acceptable, there has been a danger, for example, should a firearm be dropped, that the safety bar may move sufficiently to allow the sear to move away from the bolt to such an extent as to cause the firearm to accidentally discharge. Further, it has been possible that the safety bar may accidently move while the grip safety has been depressed so as to cause an inadvertant firing of the firearm.

Accordingly, it is an object of this invention to reduce the possibility of an inadvertant firing of a firearm.

It is another object of this invention to provide a simple mechanism for locking the sear of a firearm in place.

It is another object of the invention to provide a secure lock means for preventing unauthorized cocking or firing of a firearm.

It is another object of the invention to provide a lock means which is simple to actuate.

It is another object of the invention to provide a lock means for a sear of a firearm which is actuated from a convenient position adjacent to a triggering mechanism.

Briefly, the invention provides a simple and efficient lock means for locking a sear of a firearm against accidental movement. The lock means is adapted for use with a safety lock mechanism, for example, of the grip safety type, which includes a movable safety bar. For example, where the safety bar is pivotally mounted to move into and out of the path of movement of a sear, the lock means of the invention includes a lock slide which is hingedly secured to the safety bar to move therewith and a lock which is adapted to lock the lock slide against movement. The lock is of any suitable type and is positioned for ready access in the housing of the firearm. For example, the lock can be constructed as a combination lock, a key lock or any other suitable lock for manipulation from the exterior of the firearm.

In use, with the lock securing the lock slide in place, the safety bar of the safety lock mechanism cannot move away from the sear. Thus, the sear remains in a locking relation with the bolt. In order to permit release of the bolt, the lock is first manipulated to release the lock slide. The safety bar is then free to move away from the sear while carrying the lock slide. Thereafter, upon release of the thumb and grip safety lock mechanisms, the safety bar is moved away from the sear while withdrawing the lock slide from the lock. The sear is

then free to move away from the bolt upon actuation of the triggering mechanism in the usual manner.

These and other objects and advantages of the invention will become more apparent from the following detailed description and appended claims taken in conjunction with the accompanying drawings in which:

FIG. 1 illustrates a side view of a firearm incorporating a lock means according to the invention;

FIG. 2 illustrates a fragmentary view of the firearm of FIG. 1 and the lock means of the invention;

FIG. 3 illustrates the locking connection between a lock slide and a lock according to the invention;

FIG. 4 illustrates the lock slide and lock in released condition; and

FIG. 5 illustrates the lock means of FIG. 2 in an opened position with the bolt having been released by the triggering mechanism.

Referring to FIG. 1, a firearm **10** such as a carbine which is of otherwise conventional structure is provided with a lock means **11** for retaining a safety bar (not shown) in place. The firearm **10** includes a trigger mechanism **12**, a grip safety **13**, a thumb safety **14** and a trigger housing **15**. The lock means **11** is mounted within the housing **15** to be activated from the exterior of the housing **15**.

Referring to FIG. 2, the trigger mechanism **12** includes a trigger **16** which is pivotally mounted on a pin **17** within the housing **15** and which carries a pawl **18** at an upper end thereof as viewed. This trigger mechanism **12** is used, as is known, to move a sear **19** which is pivotally mounted within the housing **15** about a pin **20** so as to pivot the sear away from a bolt **21**. As shown in FIG. **2**, the trigger mechanism **12** is movably mountd in in-dependent relation to the movably mounted sear **19**. The bolt **21**, as is known, is spring mounted within the housing **15** so as to move to the left, as viewed under the bias of a spring **22**. The bolt **21** has a notch **23** in the underside which receives the sear **19** such that the bolt **21** is held in a locked position. In addition, a disconnect **24** of known construction is mounted on the pin **20** to cooperate with the sear **19** in the usual manner and a spring **25** is mounted about a fixed pin **26** in the housing **15** to bias the sear **19** towards the bolt **21**.

The safety lock mechanism which includes the grip safety **13** and thumb safety **14** also includes a safety bar **27** which is pivotally mounted within the housing **15** on a pin **28** and is biased by a spring **29** to project into the path of the sear **19**. As shown, the safety bar **27** in the locking position is immediately below the sear **19** so that the sear **19** cannot pivot away from and release the bolt **21**. The grip safety **13**, as is known, includes a safety plate of U-shaped cross-section which is pivotally mounted at a lower end by a pin **30** in the grip **31** of the firearm **10**. The grip safety **13** also includes a pin **32** which is fixed in the plate and passes through an elongated elliptical slot **32'** in the safety bar **27** to toggle within the safety bar **27**. The pin **32** thus serves to abut against and pivot the safety bar **27** into or out of a locking position with respect to the sear **19**. That is, upon movement of the grip safety **13** out of the grip **31**, the pin **32** pulls the safety bar **27** into the sear locking position (FIG. **2**) while upon pressing of the grip safety **13** into the grip **31**, the pin **32** pushes the safety bar **27** out of the path of the sear **19** (FIG. **5**).

The thumb safety **14** is constructed of a pin **33** of cylindrical cross-section which has a notch **34** in alignment with the safety bar **27** and a lever **35** which is dis-

posed on the outside of the firearm housing 15. The lever 35 has a flange 36 extending outwardly for manual manipulation to permit pivoting of the lever 35 and, thus, rotation of the pin 33 so that the notch 34 is aligned with the safety bar 27. The notch 34 is sized so that the safety bar 27, upon pivoting under the force of the grip safety 13 can move out of the path of the sear 19.

The lock means 11 includes a lock slide 37 which is slidably mounted within the housing 15 and hingedly connected by a pin 38 at one end to the safety bar 27. In addition, the lock means 11 has a lock 39 which is adapted to lock onto the opposite end of the lock slide 37 to fix the lock slide 37 against movement under the influence of the grip safety 13.

Referring to FIGS. 2 and 3, the lock 39 is a combination lock of known construction which includes a rectangular cup-shaped housing 40 mounted within the firearm housing 15, a U-shaped bracket 41 secured in the housing 40, a shaft 42 mounted across the bracket 41, a plurality of cam wheels 43 (e.g., three) which are independently mounted on the shaft 42 for rotation thereon and a spring biased adjusting lever 44 connected to the shaft 42. In addition, the cam wheels 43 each carry a cam plate 45 having a flat peripheral surface 46 and a slotted plate 47 is mounted within the plane of the cam wheel 43. The housing 40 is provided with a pair of slots 48 in the wall facing the lock slide 37 and suitable means for cooperating with the bracket 41 to secure the bracket 41 therein. The bracket 41, in turn, is provided with slots (not shown) in the sidewalls which are in alignment with the slots 48 in the housing 40 as well as with notches in the opposite ends of the sidewalls. These notches receive a flanged end 49 of the plate 47 while a spring 50 mounted on a tab 51 of the plate 47 biases the plate 47 outwardly of the bracket 41 so as to cause the plate 47 to move against the cam plates connected with the cam wheel 43. The opposite end of the plate 47 is provided with an integral bar 52 which is movable between a locking position in alignment with the respective slots in the housing 40 and bracket 41 and an unlocking position out of such alignment. The movement of the bar 52, i.e., the plate 47, is caused by the rotation of the cam plates of the cam wheels 43 as is known.

The cam wheels 43 of the lock 39 are each provided with a series of numbers or letters so as to indicate a predetermined code for the unlocking condition of the lock 39.

As shown in FIG. 3, the free end of the lock slide 37 has an enlarged portion from which a pair of fingers 53 project. These fingers 53 are sized to slide through the slots 48 in the sidewall of the lock housing 40 and carry projections 54 which are directed towards each other so as to define a space into which the bar 52 can project to fix the lock slide 37 within the lock 39. In addition, one of the fingers 53 is of greater length than the other and projects past the projection 54 thereon to slide on the outside of the bracket 41 so as to act as a guide for guiding the lock slide 37 within the lock 39.

When the lock 39 is in a locked position, the bar 52 is biased against the curved surfaces of the cam plates and lies in the plane of the slots 48 in the housing (FIG. 3). This prevents the end of the lock slide 37 from moving out of the lock 39. In the opened condition (FIG. 4), the cam plates are positioned such that the bar 52 is out of the plane of the slots 48 in the housing. The lock slide 37 can then be moved out of the lock 39.

Referring to FIG. 2, when the lock slide 37 is fixed in place within the lock 39, motion of the safety bar 27 is prevented. Thus, should the thumb safety 14 be in opened position and the grip safety 13 pressed into the grip 31, the safety bar 27 will not move. As a result, the sear 19 cannot be pivoted downwardly, as viewed, by the trigger mechanism 12 due to the blocking effect of the safety bar 27. The bolt 21, in turn, cannot be released to eject or fire a projectile or cartridge 55.

Referring to FIG. 5, with the lock 39 in the opened position and the thumb safety 14 released upon pressing of the grip safety 13, the safety bar 27 pivots about the pin 28 out of the path of the sear 19. As the safety bar 27 pivots, the lock slide 37 is slid out of the lock housing 40. Thereafter, when the trigger mechanism 12 is pivoted, the sear 19 is pivoted out of the plane of the bolt 21 so that the bolt 21 is released under the force of the spring 22 to fire the projectile or cartridge 55 out of the firearm 10.

In order to allow the lock 11 to be manipulated from the outside, the cam wheels 43 project through slots within a suitable depression 56 (FIG. 1) in the housing 15 of the firearm adjacent to the trigger mechanism 12. Thus, should the owner of a firearm, or weapon, incorporating the lock of the invention wish to prevent unauthorized cocking or firing, one or more of the cam wheels 43 of the combination lock 39 can be easily rotated. This prevents the lock slide 37 from moving should the grip safety 13 be depressed.

The invention thus provides a lock means which substantially reduces the possibility that a firearm will be cocked or discharged either inadvertantly or by an unauthorized use. That is, the lock means prevents the sear from pivoting since the safety bar of the safety mechanism is fixedly held in place.

It is to be noted that while a combination lock of a specific construction has been described above, any suitable lock can be used. For example, a key actuated lock can be used.

The invention further allows the owner of a firearm to quickly lock the firearm against discharge should another attempt to wrest control of the firearm away from the owner.

What is claimed is:

1. In combination,

a movably mounted sear for a firearm;

a trigger mechanism movably mounted in independent relation to said sear for moving said sear in a predetermined path;

a safety lock mechanism including a safety bar positioned in said path to prevent movement of said sear in said path and means for moving said safety bar out of said path; and

a lock means connected to said safety bar to retain said safety bar in said path against the moving force of said means for moving said safety bar.

2. The combination as set forth in claim 1 wherein said lock means includes a movably mounted lock slide connected to said safety bar and a lock for selectively securing said lock slide in place.

3. The combination as set forth in claim 2 wherein said lock slide is hingedly connected to said safety bar and said safety bar is pivotally mounted to pivot in a predetermined arcuate path away from said path of said sear.

4. The combination as set forth in claim 2 wherein said lock includes a pivotally mounted bar for securing one end of said lock slide in said lock and means for pivoting said bar from said lock slide to release said lock slide from said lock.

5. The combination as set forth in claim 1 wherein said means for moving said safety bar includes a grip safety.

6. The combination as set forth in claim 5 wherein said safety lock mechanism further includes a rotatable thumb safety selectively positioned in the path of movement of said safety bar.

7. In combination,

a sear for a firearm;

a trigger mechanism for moving said sear in a predetermined path;

a safety lock mechanism including a safety bar positioned in said path to prevent movement of said sear in said path and means for moving said safety bar out of said path; and

a lock means connected to said safety bar to retain said safety bar in said path against the moving force of said means for moving said safety bar, said lock means including a movably mounted lock slide connected to said safety bar and a combination lock for selectively securing said lock slide in place.

8. In combination with a firearm having a bolt for firing a projectile and a pivotally mounted sear for selectively locking said bolt in a predetermined locked position, a trigger mechanism pivotally mounted in independent relation to said sear for moving said sear to unlock said bolt, and a safety lock mechanism for preventing movement of said sear; a lock means connected to said safety lock mechanism to selectively prevent movement of said sear.

9. The combination as set forth in claim 8 wherein said lock means includes a lock slide connected to said safety lock mechanism to prevent actuation thereof and a lock selectively connected to one end of said lock slide to prevent movement of said lock slide.

10. The combination as set forth in claim 9 wherein said lock is a combination lock.

11. The combination as set forth in claim 8 wherein said firearm includes a housing mounting said trigger mechanism, safety lock mechanism and lock means therein; said lock means communicating with the exterior of said housing.

12. The combination as set forth in claim 11 wherein said lock means includes a combination lock having a plurality of rotatable cam wheels projecting from said housing for manipulation.

13. The combination as set forth in claim 11 wherein said sear is pivotally mounted in said housing and said bolt includes a notch for receiving a portion of said sear therein.

14. In combination with a firearm having a bolt for firing a projectile and a sear for selectively locking said bolt in a predetermined locked position, a trigger mechanism for moving said sear to unlock said bolt, and a safety lock mechanism for preventing movement of said sear; a lock means connected to said safety lock mechanism to selectively prevent movement of said sear, said lock means including a lock slide connected to said safety lock mechanism to prevent actuation thereof and a lock selectively connected to one end of said lock slide to prevent movement of said lock slide and said safety lock mechanism including a pivotally mounted safety bar for movement into and out of said path of said sear, said safety bar being hinged to one end of said lock slide to pull said lock slide from said lock.

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