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FIREARM

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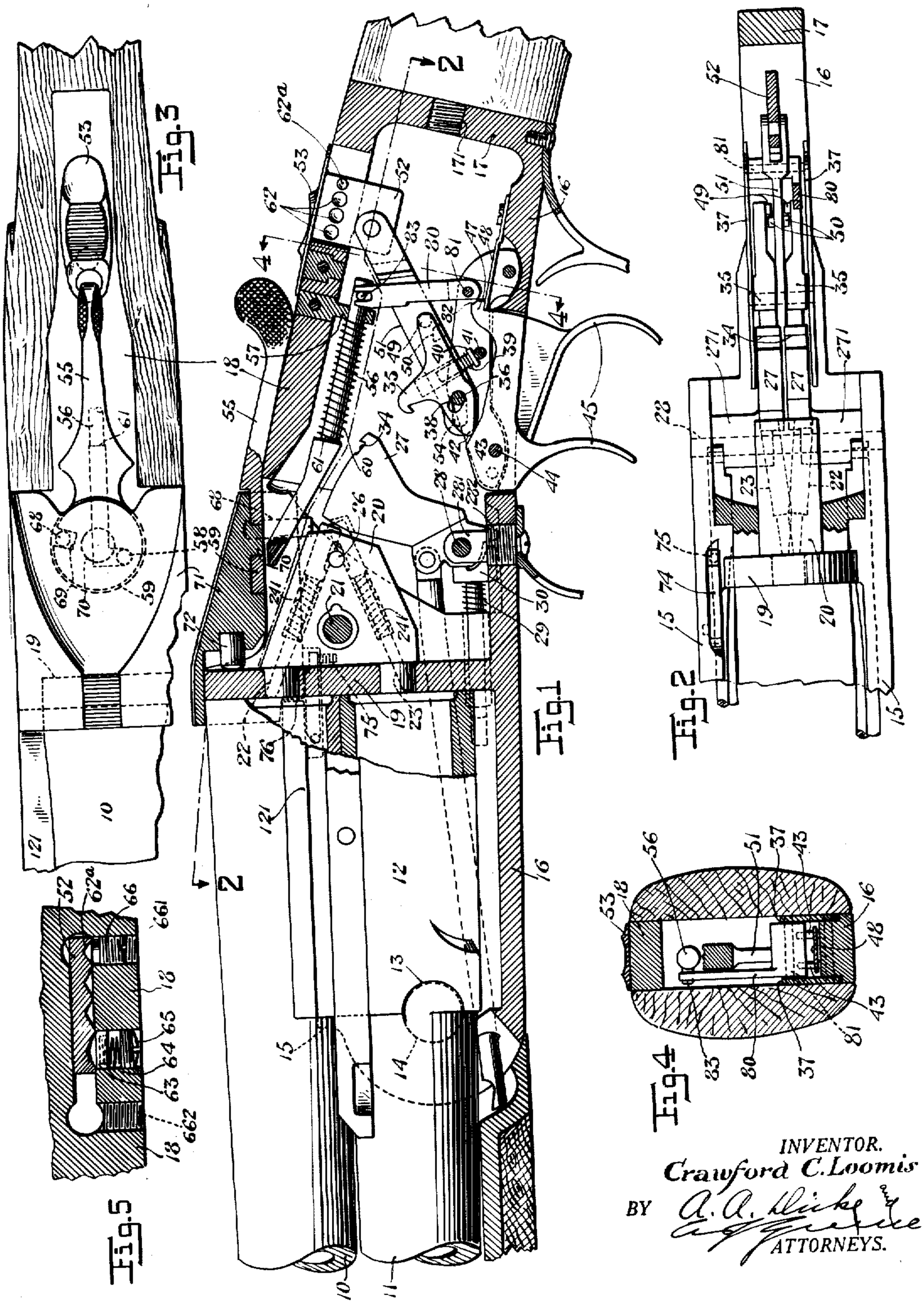

Fig. 3

Fig. 1

Fig. 2

Fig. 5

Fig. 4

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FIREARM

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This invention relates to firearms, particularly firearms of the upward tilting breech type, and contemplates a safety device associated with the breech mechanism in such a way as to prevent movement of the fire control mechanism at all times when the breech is unlocked. For the purpose of illustration, the invention has been shown as applied to a superposed barrel gun having the breech and fire control mechanisms disclosed in my prior co-pending application, Serial No. 511,190, filed January 26, 1931. This application of the invention, however, is merely illustrative.

It is common practice to provide upward tilting breech guns with a safety device arranged to engage either the sear or trigger, and manually operable by a sliding finger piece conveniently located on the top or "tang" of the breech mechanism frame. Such a safety device may be arranged to block the firing mechanism when the slide occupies an intermediate position, and to release the firing mechanism, placing the gun in a "ready to fire" condition when the slide is moved either backward or forward from its intermediate "safe" position. The breech locking mechanism may be so arranged with respect to the safety mechanism that when the slide is in its forward firing position it will be restored to "safe" position by the unlocking of the breech; but when the slide is in its rearward firing position it is not moved by unlocking the breech, and the gun remains in firing condition unless the slide is manually operated. The latter mode of operation is particularly useful in trap shooting, in which repeated firing without manipulation of the safety slide is especially desirable. Provision may even be made, as in my co-pending application above-identified, for locking the slide in its rearward firing position, thus completely disabling the safety mechanism.

It will be apparent that if the mechanism is not rendered safe, in some part of the breech unlocking, opening or closing movements, it is possible to release the firing hammers at a time when the breech has been sufficiently closed to align the primer of a cartridge in the magazine with the firing pin, and the breech is not locked; and the explosion of a cartridge with an unlocked breech is potentially dangerous.

The present invention aims to overcome the danger inherent in prior constructions, without sacrificing any of the advantages thereof, by providing a trigger locking device operable independently of the above-described safety slide and effective at all times that the breech is open or unlocked. In the preferred construction, this trigger locking device is operated by the lever which controls the locking and unlocking of the breech.

Other objects and features of this invention will appear more clearly from the following description taken in connection with the accompanying drawing and appended claims.

In the drawing:

Fig. 1 is a fragmentary longitudinal section of a firearm illustrating one embodiment of the present invention. This figure shows the parts in the positions they occupy just after the gun has been fired.

Fig. 2 is a plan view, partly in section, upon the broken line 2—2 of Fig. 1.

Fig. 3 is a fragmentary plan view of the frame or receiver section of the firearm.

Fig. 4 is a transverse section, substantially on the line 4—4 of Fig. 1.

Fig. 5 is a detail showing the safety slide moved to a position in which it is not affected by the top lever.

Referring to Fig. 1 the upper barrel 10 and the lower barrel 11 are rigidly secured at their rear ends in a breech piece 12. In the forward edges of the breech piece are provided forwardly facing half journals 13 adapted to receive pivot studs 14 projecting inwardly from the sides 15 of the main frame (Fig. 2).

The fire control mechanism is all supported upon a unitary and preferably integral main frame which comprises the aforementioned side plates or flanges 15 projecting upwardly from the forward section of a bottom plate 16. The rearward portion of the frame is in the form of an

open rectangle, comprising the bottom plate 16, a post or column 17, a top plate member 18, and a breech closing block or partition wall 19, all preferably integral, and suitably formed to receive and support the mechanism to be described. The post 17 comprises an aperture 171 threaded to receive the stock holding screw. The partition wall 19 is suitably apertured to receive the firing pin, hammer cocking rods and hammer spring plungers, and the forward end of the top plate 18 is widened and curved to receive the sliding breech cover.

The firing pins 22 and 23 are supported and partially housed in a firing pin supporting block 20 secured in place by a transverse pin 21 extending through the breech closing member 19 which is suitably slotted to receive the block 20. This block is apertured and counter-bored to receive the two firing pins with their retracting springs 241, and a common cross pin 26 retains the firing pins in place.

The fire control mechanisms for the two barrels are counterparts, each comprising similar elements arranged side-by-side; hence, a description of one fire control mechanism is applicable to both. Each fire control mechanism comprises a firing hammer 27 pivoted on a cross pin 28. The ends of cross pin 28 are supported in the frame flanges 15 and a centrally located bearing member 281, said bearing member comprising at its lower end a threaded enlargement 282 which is screwed into an aperture in the frame plate 16.

The upper or firing pin and sear engaging portion of each hammer 27 is offset relative to its lower or hammer spring pilot engaging portion, the upper parts of the two hammers lying adjacent to each other (Fig. 2) while the lower parts comprise hubs 271 which extend outwardly to the side flanges 15. Each hammer is actuated by a hammer spring 29 arranged in a suitable well in the bottom plate 16 and acting through a pilot head 30 upon parts of the associated hammer adjacent its pivot.

Each hammer comprises a notch 34 upon its outer periphery for engagement with the nose of a sear 35 pivoted at 36 in a pair of flange plates 37 projecting upwardly from the bottom frame plate 16. The pivot receiving opening in each sear 35 is an elongated slot 38 (Fig. 1) for the purpose of permitting the momentary displacement of the sear when the associated hammer is cocked with the safety mechanism in "safe" position, as hereinafter more fully described.

Each sear is urged into the position with respect to its pivot illustrated in Fig. 1 by a spring 39 partially housed in a suitable well in the sear and guided by a spring pilot 40 bearing at its lower end upon a transverse rod 41 secured in the flange plates 37. Each sear comprises a forwardly extending toe 42 adapted to engage a trigger 43 pivoted at 44 in the plate 16. The triggers are provided with the usual finger pieces 45, shielded by a trigger guard 46 attached to the base plate 16 in any suitable manner. Each trigger includes a rearwardly extending nose 47 overlying a suitable spring 48 by which each trigger is held in contact with the toe 42 of the associated sear.

Each of the sears 35 is provided with a laterally extending pin or lug 49 adapted for co-operation with a lug 50 upon a safety bar 51. Said safety bar is pivoted at its rearward end to a sliding plate 52 associated with a safety operating finger piece 53. The safety bar 51 extends forwardly and downwardly from the plate 52, passing between and acting as a separator for the sears, and at its lower end comprises a slot 54 which receives the sear pivot 36. It will be understood that there is but one safety bar 51 and that said bar is provided on opposite sides with lugs 50 for cooperation with the lugs 49 on the two sears. When the finger piece 53 is in its forward (Fig. 1) position, the lugs 50 upon the safety bar 51 stand in front of the sear lugs 49 and the sears can be operated to disengage their respective hammers. When the finger piece is retracted so that the lugs 50 stand beneath the lugs 49, the sears cannot move and, by reason of the engagement of the toes 42 of the sears with the triggers, the triggers cannot be moved. The entire firing mechanism is thus securely locked against operation. When the safety operating finger piece has been moved forwardly (Fig. 1) to permit firing, it will be restored to "safe" position by the movement of the top lever 55 necessary for opening the breech. This operation is performed through a safety operating plunger 56 supported at its rear end in an apertured depending post 57 and pivoted at 58 (Fig. 3) to the hub 59 of the top lever. A spring 60 is interposed between the post 57 and a suitable shoulder 61 upon the plunger, thereby not only holding the plunger in its forward position but likewise holding the top lever 55 in its normal position.

Means are provided for adjusting the safety mechanism, first, so that it will not be automatically moved to "safe" position upon the movement of the top lever, but may be manually operated; and, second, so that the gun is in "ready to fire" condition at all times. These features are desirable, for example, for trap shooting, in which there is no necessity for rendering the gun safe every time it is opened for reloading, and such functioning is a positive inconvenience. Accordingly there is provided a third position for the safety bar 51, plate 52, and finger piece 53, in which the lugs 50 stand in the rear of the sear lugs 49, and the plate 52

entirely out of the path of movement of plunger 56. Adjustable means are also provided for optionally preventing movement of the safety mechanism to this rearmost position or preventing its movement to its forward or automatically operated position. To this end plate 52 is provided with a series of V-shaped grooves or notches 62 adapted to receive the rounded end of a short plunger 63 (Fig. 5) pressed inwardly by spring 64 held in place by a short screw 65, threaded into a transverse aperture in the frame 18. The plate and associated parts are thus yieldingly held in the position to which they may be moved, and are prevented from stopping in an intermediate position. Fig. 1 shows parts of the safety mechanism in the normal firing position, that is, with the finger piece 53 moved forwardly. The slot in the frame 18 which receives the plate 52 is of sufficient length to permit the movement of said plate to the rearward or "manually safe" position aforementioned, but movement of the plate 52 to such position is normally blocked by means of a screw 66 threaded into a transverse aperture 661 in the frame 18. By retracting said screw, plate 52 and associated parts may be moved to the manual safe position and will remain there until manually restored to one of the forward positions, the spring plungers 63 occupying the foremost one of the notches 62, and if it is desired to positively prevent accidental restoration to an "automatic safe" condition the stop screw 66 may be inserted in front of plate 52 through the threaded opening 662. Moreover, the parts being in "manual safe" position, they may be set to prevent movement to "safe" position by advancing the screw 66 through opening 661 until its conical point enters the supplemental notch 62a in plate 52, as seen in Fig. 5.

The top lever 55 is pivoted upon a pin or stud 68, projecting from a journal opening in the frame plate 18 and engaging a notch 69 in the hub 59 of the top lever. The hub 59 comprises a central aperture adapted to receive a projection 70 of the main locking bolt or breech cover 71; said locking bolt having formed therein an annular recess which receives the hub 59, as clearly shown in Fig. 1. When said locking bolt is in its forward position (Fig. 1) it projects over the rear end of the barrel assembly, thereby locking the breech. The top lever is moved to its normal central position by spring 60, as aforesaid; the locking bolt being thereby carried to its forward or breech locking position; its forward movement by spring 60 is limited by a suitable stud 72 which engages the partition wall 19 of the frame. Movement of the top lever to the right from its normal (Fig. 3) position will retract the locking bolt to permit the opening of the breech by reason of the eccentric mounting of the top lever on the frame 18 and its central connection with the top lever.

Means are provided for holding the breech cover retracted until the breech is closed, comprising a short lever 74 (Fig. 2) pivoted in one of the side plates 15 and urged upwardly by a spring 75 to engage a shoulder 76 on the breech cover. When the breech is closed, said lever is depressed out of engagement with shoulder 76 through its engagement by the ledge 121 on the breech piece 12.

The mechanism thus far described corresponds substantially to that disclosed and claimed in my prior application above-mentioned. This mechanism has been selected as illustrating one form of fire control to which the present inventions are applicable.

As stated above, when the safety plate 52 is adjusted to its rearmost position (Fig. 5) the bar 51 is rendered ineffective to lock the sears 35 at any time. With the safety mechanism in this condition, the triggers and sears are free throughout the closing movement of the breech. Now as the breech is closed, with fresh shells in the chambers, the shell primers come into sufficient alignment with the firing pins to be struck thereby, before the breech lock latch 74 has released the breech lock or the lock has moved forward, so that it is possible to free the firing hammers and fire one or both of the shells in the chambers with the breech not fully closed, or fully closed and not locked. Such a misoperation, while unusual, may cause serious injury to either the firearm, the shooter or both. To obviate these possibilities, the present invention provides a trigger lock which is operated automatically whenever the breech lock is retracted, but which becomes disabled automatically as soon as the breech is closed and locked. For this purpose a locking lever 80 is pivoted near its lower end on a pin 81 extending between the sear supporting flange plates 37. The lower end of the locking lever is of sufficient width to overlie both of the triggers 43, as clearly shown in Fig. 4. The noses 47 of the triggers are provided with upper surfaces 82 curved to conform with the lower end of the locking lever. The upper end of the lever 80 is bifurcated to receive a pin 83 extending laterally from the plunger 56.

When the top lever 55 is in its normal position for locking the breech, the plunger 56 is positioned forwardly (Fig. 1) and retains the locking lever 80 out of the path of the triggers 43. To unlock the breech the top lever must first be turned and, as described previously, the lever will be held in this position by the latch 74 until the breech has been closed. Such movement of the top lever, as pointed out hereinbefore, shifts the plunger 56 rearwardly, and thru stud 83 rocks lever 80, moving its lower end into

the path of the part 82 of triggers 43. After the gun has been reloaded and the breech closed, the top lever 55 is moved back to its normal position by spring 60, restoring the plunger 56 and the locking lever 80 to their Fig. 1 positions. From the above it will be seen that it is impossible to release the firing hammers unless the breech is not only completely closed, but locked; and, further, that both the locking of the triggers when the breech is unlocked and their release when the breech is locked are entirely automatic.

The invention is not to be construed as limited to the precise embodiment which has been selected for purpose of illustration, but is to be understood to contemplate all such modifications and equivalent devices as fall within a broad construction of the appended claims.

What is claimed is:

1. In a gun adapted to be opened for reloading, means for locking the gun in closed position, manual means for simultaneously unlocking the gun and locking the trigger, and means operable automatically when the gun is restored to closed position for unlocking the trigger.

2. In a firearm comprising a firing hammer, a trigger for controlling said hammer, and a breech mechanism adapted to be opened to permit reloading; in combination, means for locking said breech mechanism in closed position, means for releasing said locking means, a lock for the trigger operated by said releasing means, and means actuated by the closing of said breech mechanism for disabling said trigger lock.

3. In a firearm comprising a frame, a barrel pivoted thereto, means for locking the barrel to the frame, a manipulative lever adapted to unlock said barrel, means for preventing movement of the lever to locking position while the barrel is open with respect to the frame, and means controlled by the lever for locking the trigger during such time only as the lever is in unlocking position with respect to the barrel.

4. A firearm as defined in claim 3 which includes means for restoring the lever automatically to unlocking position when the barrel is moved to closed position.

5. In a firearm, a breech locking bolt, a bolt retracting device, means for retaining said bolt in retracted position while the breech is open, and a safety device moved to effective position by the unlocking movement of said bolt and to ineffective position by the locking movement of said bolt.

6. In a firearm as defined in claim 5, means for automatically restoring the bolt retracting device to locking position when the breech is moved to closed position.

7. A firearm comprising a frame, a barrel pivoted thereto, means for locking the barrel in closed position with respect to the frame, a trigger locking device, means requiring movement of said device to locking position as a preliminary to the opening of the barrel, and means for automatically unlocking the trigger when the barrel is restored to closed position.

8. In a firearm, a breech locking bolt, a bolt retracting device, a safety mechanism movable by said bolt retracting device, manually operable means for disabling said safety mechanism and a separate safety device movable by said bolt retracting device independently of said disabling means.

9. In a firearm, a breech locking bolt, a bolt retracting device, a safety mechanism having a safe position and a firing position from which it is restored to safe position by the movement of the bolt retracting device, said safety mechanism being movable to a second firing position in which it is not affected by said bolt retracting device, and a separate safety device operable by the bolt retracting device.

10. In a firearm, a safety mechanism having a safe position and a firing position, means for automatically restoring said safety mechanism from the firing position to the safe position, said mechanism having a second firing position wherein the safety mechanism is disabled, and a separate safety device operable automatically when said safety mechanism is in any of its positions.

11. A firearm comprising a supporting frame, a trigger and a locking lever therefor both pivoted with respect to the frame, said lever having a portion adapted to be moved into and out of the path of the trigger, a rod connected to the lever for actuating the same, yieldable means urging the rod toward unlocking position, and manipulative means for moving the rod to locking position.

12. A firearm comprising a supporting frame, a trigger, a locking lever therefor pivoted to the frame, said lever having a portion movable into and out of the path of the trigger, resilient means tending to move the lever out of locking position, and positive means for moving the lever into locking position, said positive means comprising a manipulative lever pivoted to said frame.

13. In a firearm, a supporting frame, a trigger, a locking device therefor pivoted to the frame and having a portion movable into the path of the trigger, means for actuating the locking device comprising a plunger supported by said frame, a manipulative lever pivoted to the frame for actuating the plunger, and a pin and slot connection between the plunger and the lever.

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