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SAFETY DEVICE FOR AUTOMATIC FIREARMS

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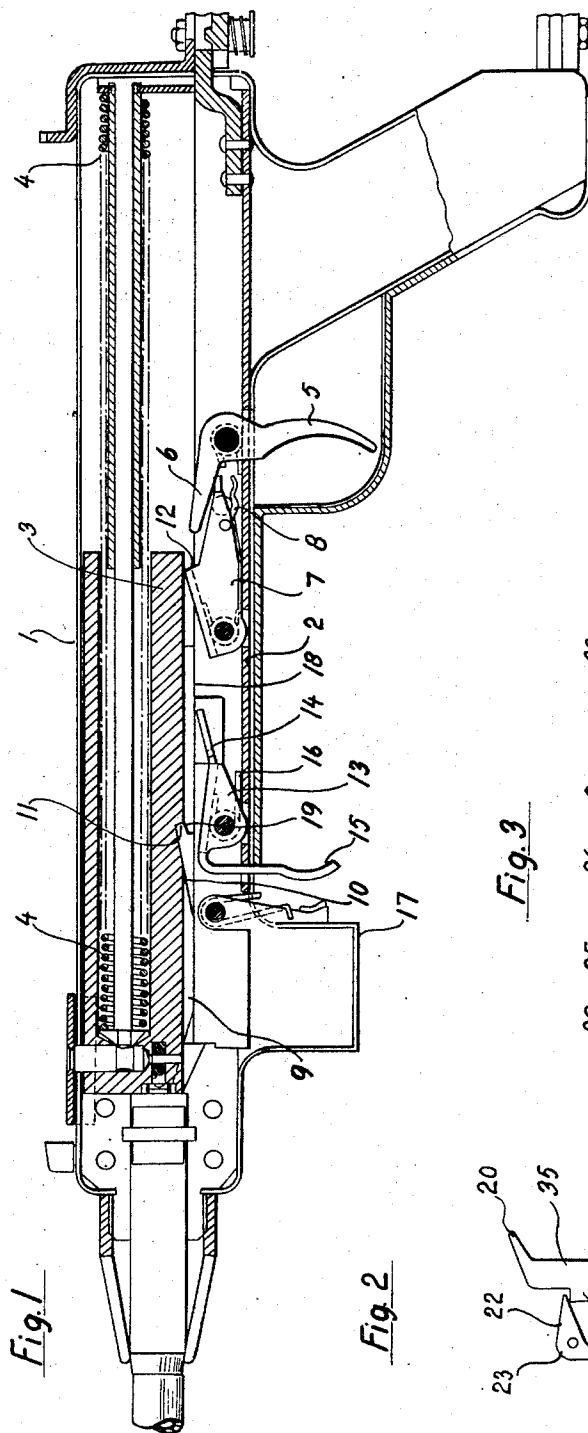


Fig. 1

Fig. 2

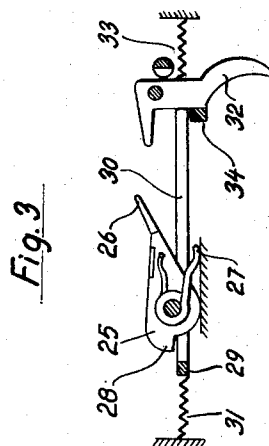
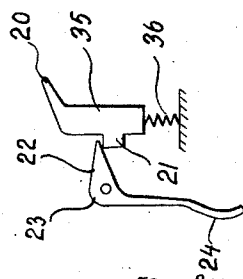


Fig. 3



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SAFETY DEVICE FOR AUTOMATIC FIREARMS

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4 Claims. (Cl. 89—142)

The invention relates to a safety device for automatic firearms of the type which comprise a spring pressed recoil operated reciprocable breech-bolt which is slidably mounted in a receiver and when the mechanism is cocked, the breech-bolt is held retracted against the action of the recoil-spring by a spring-actuated stop or sear which is disengageable from the breech-bolt by the operation of the trigger. On pulling the trigger the breech-bolt will be released and by the action of the recoil-spring it will move forwardly to its foremost position and fire the cartridge.

The present application is a continuation-in-part of my copending application, Serial No. 265,865, now Patent Number 2,749,642, filed January 10, 1952.

The object of the invention is to provide safety means to prevent unintentional or accidental firing, for example due to an insufficient retraction of the breech-bolt when cocking the gun, so that the breech-bolt is not drawn back far enough to be caught by the spring-actuated stop or sear, or due to a violent mechanical shock or blow on the gun causing said sear to release the breech-bolt without pulling the trigger. A further object of the invention is to provide means for automatically rendering said safety device inoperative during firing when the gun is manipulated in the normal and intended manner by the operator.

These safety means may be arranged to be rendered inoperative for firing by the operator's normal two-handed grip on the gun when he is ready to fire, or they may be rendered inoperative by means responsive to pulling on the trigger for firing.

To explain more clearly the nature of the invention and the way in which it may be carried out some embodiments of the invention are shown in the attached drawings and will hereinafter be described in detail.

Referring to the drawing:

Figure 1 is a longitudinal sectional view in elevation of an automatic firearm provided with a safety device in accordance with the invention.

Figure 2 is a diagrammatic elevational view showing a modified form of safety pawl for use in the firearm of Fig. 1.

Figure 3 is a diagrammatic elevational view showing another modified form of safety device for use in the firearm of Fig. 1 and which is rendered inoperative to permit firing of the weapon by means which are responsive to pulling on the trigger.

Referring to Fig. 1, there is shown a firearm which comprises a hollow body portion or receiver 2. A breech-bolt 3 of square cross-section is slidably mounted for longitudinal reciprocation in the receiver 2, the breech-bolt 3 being shown in its foremost or firing position. The breech-bolt 3 is continuously pressed forwardly by a recoil actuated spring 4 of the helical compression type. In the receiver 2, there is disposed a trigger mechanism comprising a pivotally mounted trigger 5 having a generally horizontally extending arm 6 arranged, upon pulling the trigger, to press downwardly on a rearwardly extending sear 7 which is also pivotally mounted in the

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receiver 2. The sear 7 is urged in a counterclockwise direction by a leaf spring 8 so that its upper edge is pressed against the under side of the breech-bolt 3. The under side of breech-bolt 3 is provided with a smooth surface for engagement with the upper edge of sear 7 and a transversely extending notch 10 is formed therein, the notch 10 having a forwardly inclined rear face 11. The sear 7 is provided with a sloping rear face 12 which is engageable with the rear face 11 of the notch 10 when the breech-bolt 3 is moved rearwardly to its cocked position. When the trigger 5 is pulled, its forwardly extending arm portion 6 will press downwardly on the sear 7 urging it in a clockwise direction so that its rear face 12 will be withdrawn from notch 10 and cannot reenter notch 10 until trigger 5 is released. When trigger 5 is held pulled, the piece will fire automatically and will continue to fire until trigger 5 is released or the supply of ammunition becomes exhausted.

In the receiver 2, there is disposed a pivotally mounted safety pawl 13 located forwardly of the sear 7. The safety pawl 13 comprises a relatively thin rearwardly extending arm 14 and a downwardly extending actuating arm 15. The arm 14 is pressed upwardly against the under side of breech-bolt 3 by a helical torsion spring 16. As the breech-bolt 3 moves forwardly from its cocked position, the rearwardly extending arm 14 of safety pawl 13 is urged by torsion spring 16 to enter the notch 10 in the under side of the breech-bolt 3, thereby stopping the forward movement of the breech-bolt 3 and holding the breech-bolt 3 in an intermediate safety position before it can reach its foremost or firing position and fire the next cartridge.

The receiver 2 comprises a downwardly extending ammunition magazine 17 located at the forward portion of the receiver 2. When firing the weapon, the magazine 17 is usually gripped with one hand and the trigger 5 is pulled with the other hand. The downwardly extending actuating arm 15 of safety pawl 13 is located in proximity to and immediately behind the magazine 17. In gripping the magazine 17, the downwardly extending actuating arm 15 of safety pawl 13 is pressed forwardly, holding the safety pawl 13 rotated in a clockwise direction and preventing the rearwardly extending arm 14 from moving upwardly and entering the notch 10 in breech-bolt 3 during automatic operation of the firearm. The safety device is thus rendered inoperative by gripping the actuating arm 15 and the weapon may be fired at will by pulling on trigger 5.

The longitudinal groove 9 formed in the under side of breech-bolt 3 defines two downwardly extending spaced parallel side rails 18 on the under side of the breech-bolt 3. The rearwardly extending arm 14 of safety pawl 13 is wider than the groove 9 so that its free end is pressed upwardly against the lower surfaces of the side rails 18. The transverse notch 10 extends completely across the under side of the breech-bolt 3 including the side rails 18, thereby permitting the wide end of the rearwardly extending arm 14 of safety pawl 13 to enter notch 10 under the influence of torsion spring 16, unless manually restrained by forward pressure on actuating arm 15. Within the side rails 18, the notch 10 is shaped to form tongues 19 which extend forwardly beyond the sloping rear face 11 of the notch 10. The sear 7 is narrower than the groove 9 and is disposed within the groove 9 so that it clears the tongues 19. The arm 14 of safety pawl 13, however, being wider than the groove 9 will be trapped by the tongues 19 when it enters the notch 10 and cannot be withdrawn solely by forward pressure on the actuating arm 15. The safety pawl 13 cannot be released until the breech-bolt 3 is pulled rearwardly by hand at least to an extent sufficient to permit a free end of arm 14 to clear the tongues 19.

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Fig. 2 is a diagrammatic illustration of another form of safety pawl, the receiver being provided with a vertically movable safety pawl 35 which is pressed upwardly by a helical compression spring 36 and is held with its upper beak-shaped end 20 pressed up against the lower surfaces of the side rails 18 of the breech-bolt not shown in this figure, so that it may engage the notch 10 during the forward movement of the breech-bolt, as described above. Pawl 35 is provided with a forwardly projecting lug 21 cooperating with a horizontal arm 22 of a safety lever 23 pivoted to the receiver, the actuating arm 24 of which projects downwardly and is situated in the same position as the actuating arm 15 previously described. In the position shown in the drawing, pawl 35 is held by the lever 23 in its inoperative or firing position, the actuating arm 24 being manually held against the magazine hopper 17, and the pawl will thus not prevent the forward movement of the breech-bolt. When actuating arm 24 is released lever 23 will no longer hold down safety pawl 35 and prevent it from moving upwardly under the pressure of spring 36 and the safety device will thus prevent accidental firing of the gun.

Fig. 3 is a diagrammatic illustration of another embodiment of the safety device in which the safety pawl engageable with the notch of the breech-bolt is so connected with the trigger as to be held in its firing or inoperative position whenever the trigger is pulled. In this embodiment, the pawl 25 is pivoted to the receiver and provided with a rearwardly extending tapered beak 26, and a torsion spring 27 tends to turn the pawl 25 in a counterclockwise direction so that the beak 26 is pressed against the side rails 18 of the breech-bolt. At the opposite end to the beak 26 the safety pawl has a heel portion 28 cooperating with a stop 29 on a longitudinally movable slide member 30 which is yieldingly urged rearwardly by a helical compression spring 31. In the position shown in Figure 3 the stop 29 will not prevent the turning of pawl 25, but when the slide member 30 is moved sufficiently far to the rear so that the stop 29 is situated below the heel 28, safety pawl 25 will be prevented from turning to its safety position under the influence of torsion spring 27 and beak 26 will not engage notch 10 to prevent the forward movement of the breech-bolt.

The actuating arm 32 of the trigger is pressed forwardly by a relatively strong helical compression spring 33 against a fixed stop 34. The slide member 30 is pressed rearwardly by the compression spring 31, which is relatively weak, against the trigger actuating arm 32 but cannot move the trigger arm 32 rearwardly against the greater force of the strong compression spring 33. When trigger actuating arm 32 is pulled to fire the weapon, slide member 30 is urged rearwardly by the weak compression spring 31, thereby moving the stop 29 beneath the heel portion 28 of safety pawl 25. Counterclockwise movement of safety pawl 25 is thus prevented by stop 29 and further movement of trigger actuating arm 32 will disengage sear 7 from notch 10 to permit automatic operation of the firearm. It should be noted in connection with Fig. 3, however, that if the sear 7 were to become disengaged from notch 10 without pulling the trigger, as by the mechanical shock produced by dropping the weapon, the slide member 30 will remain in its forward position permitting rotation of safety pawl 25 to its safety position and allowing its beak 26 to enter the notch 10 and prevent accidental firing of the next cartridge.

What I claim is:

1. In an automatic firearm, in combination with a longitudinally reciprocable breech-bolt movable between a rearwardly disposed cocked position and a foremost firing position; recoil actuated spring means yieldingly urging said breech-bolt forwardly toward said firing position; spring pressed sear means releasably engageable with said breech-bolt for holding said breech-bolt in said cocked position; and manually operable trigger means for

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disengaging said sear means to release said breech-bolt and permit the automatic firing of said firearm, the provision of a safety device comprising: movable safety pawl means; stop means carried by said breech-bolt and engageable with said safety pawl means for stopping forward movement of said breech-bolt and holding said breech-bolt in a safety position intermediate said cocked position and said firing position; resilient means urging said safety pawl means toward a position in which it will engage said stop means upon forward movement of said breech-bolt from said cocked position; a movable stop member cooperating with said trigger means for movement therewith, and means carried by said safety pawl means and engageable with said movable stop member for holding said safety pawl means against the action of said resilient means and preventing movement of said safety pawl means to said stop means engaging position upon movement of said stop member accompanying firing operation of said trigger means.

2. In an automatic firearm, in combination with a longitudinally reciprocable breech-bolt having a notch formed therein, said breech bolt being movable between a rearwardly disposed cocked position and a foremost firing position; recoil actuated spring means yieldingly urging said breech-bolt forwardly toward said firing position; spring pressed sear means movable into said notch to engage said breech-bolt and hold said breech-bolt in said cocked position; and manually operable trigger means for moving said sear means out of said notch to release said breech-bolt and permit automatic firing of said firearm, the provision of a safety device comprising: a safety pawl member disposed forwardly of said sear means and pivotally mounted for rotation about an axis extending transversely below said breech-bolt, said safety pawl member comprising a rearwardly directed tip portion adapted to enter said notch and stop forward movement of said breech-bolt and hold said breech-bolt in a safety position intermediate said cocked position and said firing position; resilient means urging said tip portion of said safety pawl member toward said breech-bolt to enter said notch; a longitudinally movable slide member having a stop portion, said slide member cooperating with said trigger means for movement therewith, said safety pawl member comprising a portion engageable with said stop portion of said slide member to prevent movement of said tip portion of said pawl member to enter said notch upon longitudinal movement of said slide member accompanying firing operation of said trigger means.

3. The combination according to claim 2, in which the under side of said breech-bolt has a central longitudinal groove formed therein defining spaced downwardly extending side rails, said sear means being narrower than the space between said rails and being disposed therebetween, said notch being formed in the under side of said breech-bolt and extending transversely across the entire under side thereof including said side rails, and wherein said tip portion of said safety pawl member is wider than said groove, said tip portion being urged by said resilient means toward said side rails for entry into said notch to stop and hold said breech-bolt in said safety position, the portion of said notch which is formed in said side rails being shaped to provide forwardly extending portions for trapping said tip portion of said safety pawl member therein until said breech-bolt is drawn rearwardly from said safety position against the action of said recoil actuated spring means, and the central portion of said notch intermediate said side rails being shaped to permit withdrawal of said sear means from said notch solely by operation of said trigger means.

4. The combination according to claim 2, wherein said trigger means comprises a surface which moves rearwardly upon firing operation of said trigger means, said combination further comprising spring means urging said slide member rearwardly into engagement with said surface, said stop portion of said slide member being positioned

for engagement by said tip movement preventing portion of said safety pawl member in response to rearward movement of said slide member accompanying said rearward movement of said surface.

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References Cited in the file of this patent

UNITED STATES PATENTS

938,349 Tambour ----- Oct. 26, 1909

981,210
1,695,508
2,169,084
2,608,136

67,788
681,593

Menteyne et al. ----- Jan. 10, 1911
Skinner et al. ----- Dec. 18, 1928
Swartz ----- Aug. 8, 1939
Guisasola ----- Aug. 26, 1952

FOREIGN PATENTS

Denmark ----- Oct. 11, 1948
Great Britain ----- Oct. 29, 1952