

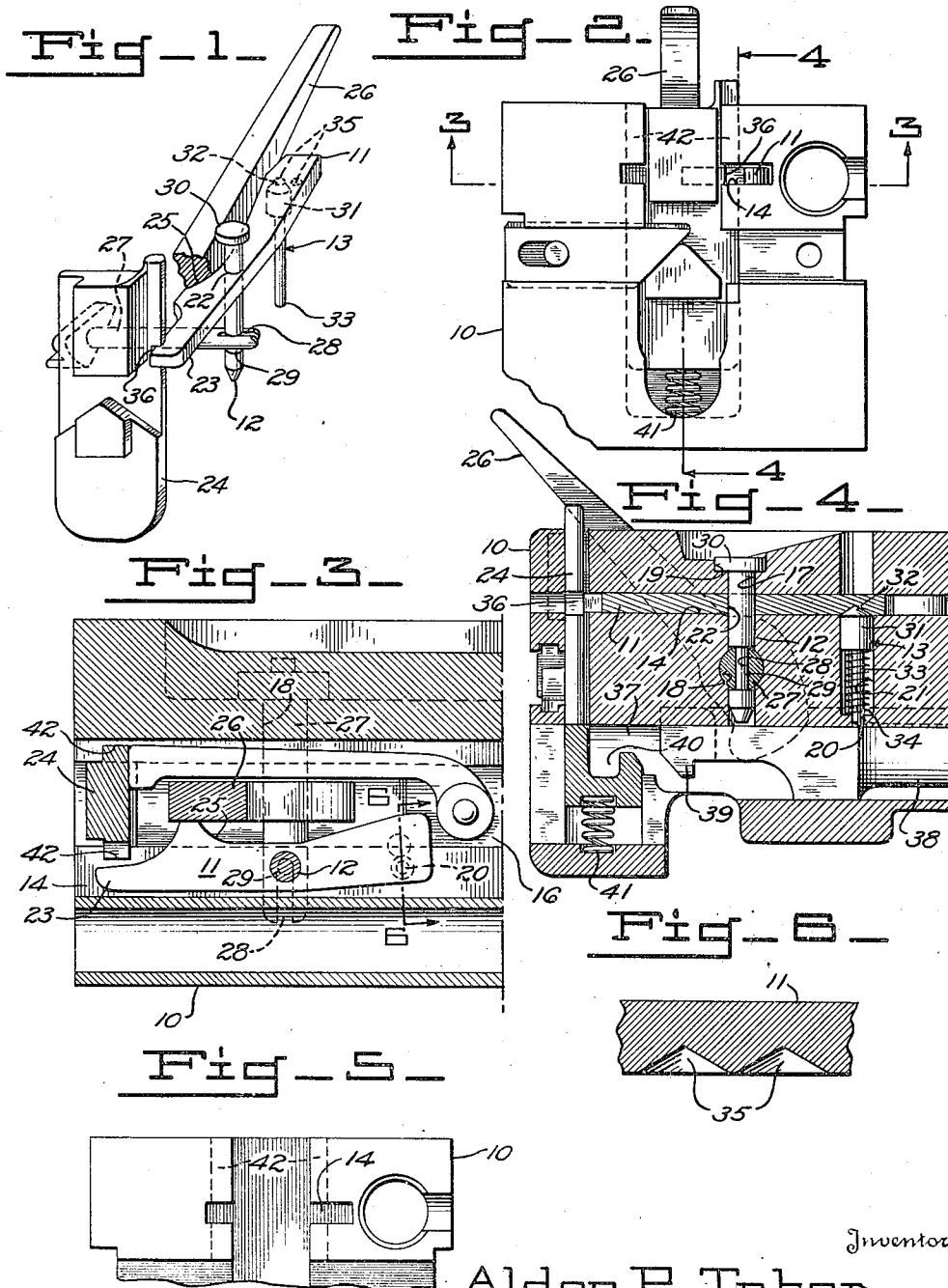
Dec. 20, 1949

A. P. TABER

2,491,534

SEAR LOCKING DEVICE FOR AUTOMATIC FIREARMS

Filed July 11, 1947



Inventor

Alden P. Taber

By *J. H. Church + W. E. Hibodeau*
Attorneys

UNITED STATES PATENT OFFICE

2,491,534

SEAR LOCKING DEVICE FOR AUTOMATIC FIREARMS

Alden P. Taber, Watertown, Mass.

Application July 11, 1947, Serial No. 760,421

12 Claims. (Cl. 89—149)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

1

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of royalty thereon.

This invention relates to a device for locking the sear of automatic firearms in the cocked position to prevent premature release of the percussion member during the counter-recoil travel of the bolt member of the firearm.

In automatic firearms, particularly machine guns, and more especially machine guns of the type shown in the U. S. patent to Browning 1,628 226, premature release of the firing pin by the sear has been a constant source of annoyance. Various means and exhaustive investigation have been resorted to in an attempt to overcome this deficiency but so far have not met with any great measure of success.

Failure of the sear to maintain engagement with the firing pin, or other percussion element that may be engaged by the sear upon cocking of such members, will result in either premature discharge of the cartridge with corresponding disastrous results, or failure to ignite the cartridge through lack of a proper blow on the primer in the locked position of the firearm bolt. The latter malfunction is the type most usually experienced with the Browning machine gun. This obviously results in a stoppage of the gun requiring manual recharging thereof in order to again place the firearm in functioning order.

Accordingly, it is an object of this invention to provide a locking device for the sear mechanism of an automatic firearm to insure that the sear will maintain engagement of the percussion element in the cocked position until the bolt member is locked in battery position.

Another object of this invention is to provide a locking device for the sear of an automatic firearm to lock such sear in the cocked position during the counter-recoil movement of a reciprocating breech member wherein an element of the reciprocating breech member is utilized to actuate such sear locking device.

A particular object of this invention is to provide a positive sear locking device for an automatic machine gun of the Browning type.

The specific nature of this invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

Fig. 1 is a perspective view of the elements of this invention removed from the firearm bolt and arranged in cooperative relationship and showing the sear locking lever engaging the sear in locked relationship.

2

Fig. 2 is a rear end view of the firearm bolt incorporating the elements of this invention.

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 2.

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 2.

Fig. 5 is a detail view showing the longitudinal slot utilized to accommodate the sear locking lever and its position with respect to the various other slots in the bolt.

Fig. 6 is an enlarged detail view showing the detent recesses provided on the underside of the sear locking lever.

The sear locking device of this invention comprises mainly a sear locking lever pivotally mounted on a firearm bolt by a vertically disposed pin. Such pin is secured against displacement by a transversely disposed cocking lever pin. The sear locking lever is provided with a cam cut on one side thereof which is contacted by a cocking lever of the bolt. In the cocked position of the sear, the sear locking lever engages a transverse notch in the sear to hold such sear locked in the cocked position. Reciprocation of the bolt pivots the cocking lever and such cocking lever, being in engagement with the cam provided on the sear locking lever, effects sideways pivotal movement of the locking lever so that the end in engagement with the notch provided on the sear is pivoted out of such notch, whereupon the usual sear release means is operative to effect release of the sear. Detent means is provided to yieldingly hold the sear locking lever in either the locked or unlocked position.

There is shown in Figs. 3 and 4, a firearm bolt 10 embodying the sear locking device. Such locking device comprises a sear locking lever 11, a pin 12 for pivotally mounting locking lever 11 to the bolt, and a detent 13. Bolt 10 is the well known Browning machine gun bolt and is identical to that used in present day Browning machine guns with the exception of minor modifications thereto in order to adapt the sear locking device of this invention to such bolt. These modifications consist largely of adding a sear locking lever slot 14, as shown, to accommodate the sear locking lever 11 and the provision of two holes to accommodate pin 12 and detent 13 as will be described.

Sear locking lever slot 14 is formed within a vertically disposed slot 16 provided in the rear end of bolt 10. Slot 14 is longitudinally disposed in vertical slot 16 on the right side, somewhat below the top surface of bolt 10 as shown in Fig. 3. At approximately the center portion of slot 14 there is provided a vertically disposed hole 17. Such hole intersects and communicates with a

3

transverse cocking lever pin hole 18. Hole 17 is provided at the top thereof with a counterbore 19. Somewhat forward of hole 17 there is provided another vertically disposed hole 20 having a counterbore 21. Hole 20 is provided to receive detent 13 as will be later described.

Sear locking lever 11 is pivotally mounted within slot 14 by pin 12. A transverse hole 22 in lever 11 accommodates pin 12 to secure such lever within slot 14. Lever 11 is essentially a flat member and is provided with a reduced width, rear end portion 23 which is utilized to engage a sear 24 as will be later described. A cam surface 25 is provided on lever 11 which is disposed adjacent a cocking lever 26. Cocking lever 26 is pivotally mounted within vertically disposed slot 16 by a pin 27 supported in the transverse hole 18 in bolt 10. Pin 27 and cocking lever 26 are conventional components of the Browning machine gun bolt and need not be further described, however the unheaded end of pin 27 is bifurcated as shown at 28 which accommodates an annular groove 29 provided near the lower end of pin 12 thereby securing such pin within hole 17. It should be mentioned that pin 12 is provided with an integral head 30 which fits within counterbore 19.

Detent 13 is provided with a head 31 having a conical point 32 thereon and a stem portion 33. Hole 20 accommodates stem portion 33 of detent 13 and a spring 34 is provided about stem 33 and is contained within counterbore 21 of hole 20. Conical end 32 of detent 13 is arranged to engage one of two conically shaped recesses 35 provided on the underside of locking lever 11.

Sear 24 is also of conventional construction with the exception of a transverse notch 36 provided near the upper right-hand edge thereof as shown in Fig. 2. Such sear is mounted within the usual opposed vertically disposed grooves 42 provided near the rear end of the bolt on opposite sides of slot 16. In one position of cocking lever 26, as will be later described, end 23 of lever 11 engages a notch 36 of sear 24. A longitudinally disposed hole 37 provided in bolt 10 accommodates a firing pin 38. Firing pin 38 is also of conventional construction and need not be further described except to mention that a hook portion 39 provided on the extreme rear end of firing pin 38 engages a sear notch 40 provided in sear 24.

In Fig. 1 the sear locking lever 11 is shown locking the sear 24. In such position, end 23 of lever 11 engages notch 36 of sear 24. The position of cocking lever 26 in such figure is that obtained when the bolt is at the extreme recoiled position. Cocking of the firing pin has then been effected and sear 24 is engaging firing pin 38.

Cocking lever 26 in this position engages the forward portion of cam surface 25. As the bolt goes into battery position in the firearm (not shown), cocking lever 26 is rotated in a counterclockwise direction and such lever contacts the rearward portion of cam surface 25 thereby rotating lever 11 about pin 12 so that end 23 is brought out of engagement with notch 36.

When a downward force has been exerted on sear 24 against the bias of a sear spring 41, hook portion 39 of firing pin 38 will be disengaged from sear notch 40 thus permitting firing pin 38 to go forwardly under the bias of the firing pin spring (not shown) to discharge a cartridge. Detent 13 meanwhile engages the corresponding conical recess 35 to yieldingly secure lever 11 in the sear locking or unlocking position.

4

From the foregoing description it is readily apparent to those skilled in the art that there is here provided a device which will positively secure the sear in searing engaging relationship with a firing pin or percussion element of a firearm and to hold such element in such locked relationship securely against vibration or other outside influences which might effect premature release of the firing pin from the sear. It is also desired to point out that the device herein described is of simple and sturdy construction requiring but slight modification of existing parts of the firearm and the addition of but few additional parts. Further, the device herein disclosed is adaptable to a firearm bolt constructed and arranged to fire from either the right or left side by simple rearrangement of the sear locking lever securing means.

I claim:

1. In an automatic firearm having a reciprocating breech member, a firing pin slidably mounted in the breech member, a cocking lever rotatably mounted on the breech member and arranged to cock the firing pin on the recoil movement of the breech member, and a sear arranged to hold the firing pin in a cocked position, the improvement comprising, a sear locking lever, and cam means on said locking lever engageable by the cocking lever to lock the sear in the cocked position during the recoil movement of the breech member.

2. In an automatic firearm having a reciprocating breech member, a firing pin slidably mounted in the breech member, a cocking lever rotatably mounted on the breech member and arranged to cock the firing pin on the recoil movement of the breech member, and a sear arranged to hold the firing pin in a cocked position, the improvement comprising, a sear locking lever, cam means on said locking lever for locking the sear in the cocked position during the recoil movement of the breech member, said cam means being engageable by the cocking lever during rotation of the cocking lever in one direction to lock the sear in cocked relationship with the firing pin, and said cam means engageable by the cocking lever during rotation of the cocking lever in the other direction to unlock the sear so that the sear may be disengaged from the firing pin.

3. In combination with an automatic firearm having a reciprocating bolt including a firing pin, sear, and a rotatable cocking lever, a sear locking device comprising a sear locking lever pivotally mounted in the bolt, and cam means on said sear locking lever engageable by the cocking lever on the recoil stroke of the bolt to pivot said locking lever into locking engagement with the sear when the firing pin is held in the cocked position by the sear, said cam means on said locking lever being engageable by the cocking lever on the counter-recoil stroke of the bolt to disengage said locking lever from the sear by the time the bolt reaches battery position whereupon the firing pin may be released from engagement with the sear.

4. In combination with an automatic firearm having a reciprocating bolt including a firing pin, sear, and a rotatable cocking lever, a sear locking device comprising a sear locking lever pivotally mounted in the bolt, cam means on said sear locking lever engageable by the cocking lever on the recoil stroke of the bolt to pivot said locking lever into locking engagement with the sear when the firing pin is held in the cocked position by the

5

sear, said cam means on said locking lever being engageable by the cocking lever on the counter-recoil stroke of the bolt to disengage said locking lever from the sear by the time the bolt reaches battery position whereupon the firing pin may be released from engagement with the sear, and detent means arranged to yieldingly hold said locking lever in either the sear engaging position or disengaged position.

5. In an automatic firearm, a reciprocating bolt, a sear locking device comprising in combination, a firing pin slidably mounted in the bolt, a sear slidably mounted in the bolt and arranged to hold said firing pin in the cocked position, said sear having a notch therein, a cocking lever in the bolt arranged to cock said firing pin on the recoil stroke of the bolt, a sear locking lever mounted in the bolt for pivotal movement in a horizontal plane, and cam means on said locking lever engageable by said cocking lever on the recoil stroke of the bolt to pivot said locking lever into said notch on said sear to lock said sear against premature release, said cam means on said locking lever being engageable by said cocking lever on the counter-recoil stroke of the bolt to unlock said sear as the bolt goes into battery position.

6. In an automatic firearm, a reciprocating bolt, a sear locking device comprising in combination, a firing pin slidably mounted for longitudinal movement in the bolt, a sear mounted in the rear of the bolt for vertical movement and arranged to hold said firing pin in the cocked position, said sear having a notch therein, a vertical pin mounted forwardly of said sear, a transverse pin adapted to secure said vertical pin in the bolt, a cocking lever mounted on said transverse pin for pivotal movement in a vertical plane in the bolt, said cocking lever being arranged to cock said firing pin on the recoil stroke of the bolt, a sear locking lever mounted in the bolt on said vertical pin for pivotal movement in a horizontal plane, cam means on said locking lever engageable by said cocking lever on the recoil stroke of the bolt to pivot said locking lever into said notch on said sear to lock said sear against premature release, said cam means on said locking lever being engageable by said cocking lever on the counter-recoil stroke of the bolt to unlock said sear as the bolt goes into battery position, whereupon release of said firing pin by said sear may be effected, and detent means arranged to yieldingly hold said locking lever in either the sear engaging position or disengaged position.

7. In an automatic firearm having a reciprocating breech member, a firing pin slidably mounted in the breech member, a cocking lever rotatably mounted on the breech member and arranged to cock the firing pin on the recoil movement of the breech member, and a sear arranged to hold the firing pin in a cocked position, the improvement comprising, a lever for locking the sear in the cocked position during the recoil movement of the gun.

8. In an automatic firearm, the combination of a reciprocating breech member, a firing pin slidably mounted in the breech member, a cocking lever rotatably mounted on the breech member and arranged to cock the firing pin on the recoil movement of the breech member, a sear arranged to hold the firing pin in a cocked position, and a lever for locking the sear in the

6

cocked position during the recoil movement of the gun.

9. In an automatic firearm, the combination of a reciprocating breech member, a firing pin slidably mounted in the breech member, a cocking lever rotatably mounted on the breech member and arranged to cock the firing pin on the recoil movement of the breech member, a sear arranged to hold the firing pin in a cocked position, a sear locking lever, and cam means on said locking lever engageable by the cocking lever to lock the sear in the cocked position during the recoil movement of the breech member.

10. In an automatic firearm having a reciprocating breech member, a firing pin slidably mounted in the breech member, a cocking lever rotatably mounted on the breech member and arranged to cock the firing pin on the recoil movement of the breech member, and a sear arranged to hold the firing pin in a cocked position, the improvement comprising, a lever for locking the sear in the cocked position during the recoil movement of the breech member, said lever being engageable by the cocking lever during rotation of the cocking lever in one direction to lock the sear in cocked relationship with the firing pin, and said lever engageable by the cocking lever during rotation of the cocking lever in the other direction to unlock the sear so that the sear may be disengaged from the firing pin.

11. In an automatic firearm, the combination of a reciprocating breech member, a firing pin slidably mounted in the breech member, a cocking lever rotatably mounted on the breech member and arranged to cock the firing pin on the recoil movement of the breech member, a sear arranged to hold the firing pin in a cocked position during the recoil movement of the breech member, said lever being engageable by the cocking lever during rotation of the cocking lever in one direction to lock the sear in cocked relationship with the firing pin, and said lever engageable by the cocking lever during rotation of the cocking lever in the other direction to unlock the sear so that the sear may be disengaged from the firing pin.

12. In an automatic firearm, the combination of a reciprocating breech member, a firing pin slidably mounted in the breech member, a cocking lever rotatably mounted on the breech member and arranged to cock the firing pin on the recoil movement of the breech member, a sear arranged to hold the firing pin in a cocked position, a sear locking lever, cam means on said locking lever for locking the sear in the cocked position during the recoil movement of the breech member, said cam means being operable by the cocking lever during rotation of the cocking lever in one direction to lock the sear in cocked relationship with the firing pin, and said cam means operable by the cocking lever during rotation of the cocking lever in the other direction to unlock the sear so that the sear may be disengaged from the firing pin.

ALDEN P. TABER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,027,892	Williams	Jan. 14, 1936