Jan. 30, 1951 F. W. SAMPSON ET AL 2,539,554

TRIGGER AND SEAR MECHANISM

Original Filed May 1, 1944 2 Sheets-Sheet 1

Fig. 1.

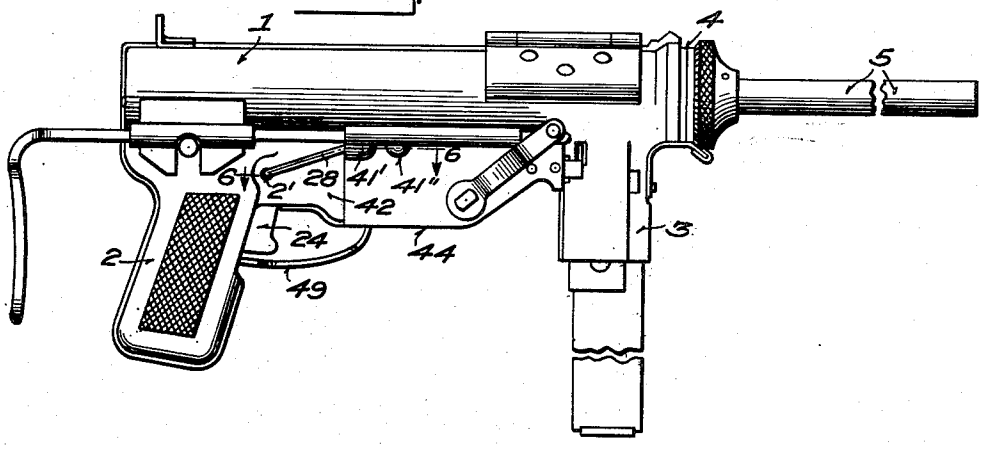


Fig. 2.

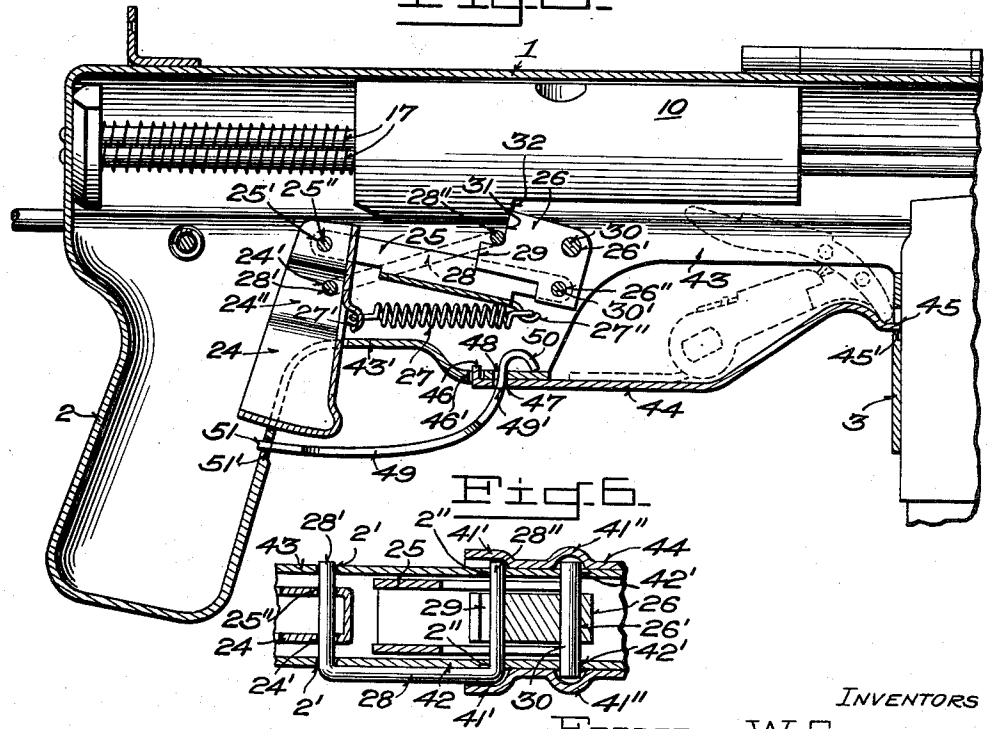


Fig. 6.




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Fig. 3.

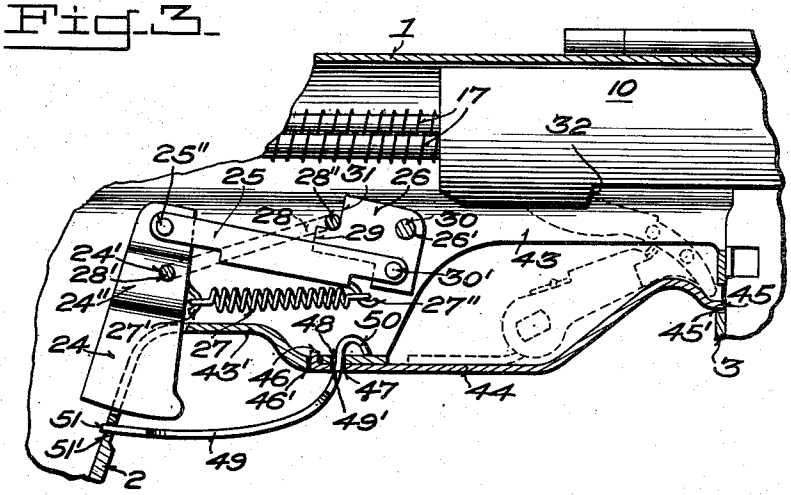
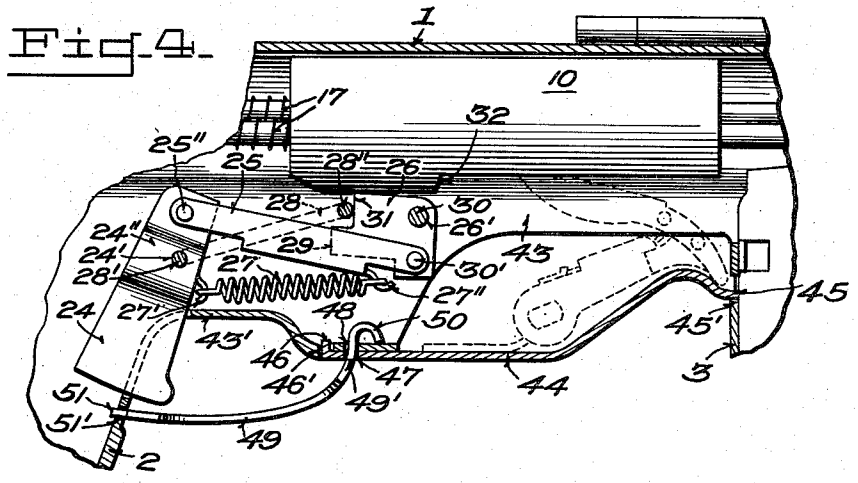



Fig. 4.



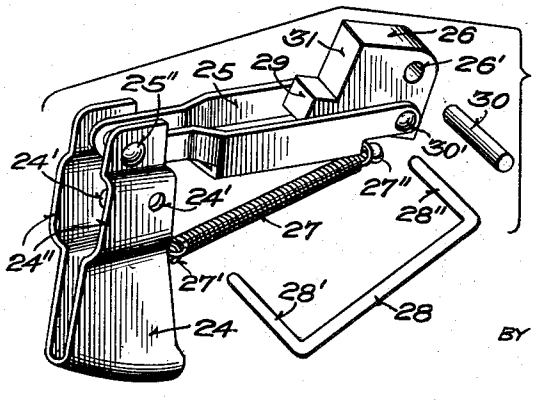




Fig. 5.

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2,539,554

## TRIGGER AND SEAR MECHANISM

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Original application May 1, 1944, Serial No. 533,566. Divided and this application August 14, 1946, Serial No. 690,519

2 Claims. (Cl. 42—69)

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This invention relates to a trigger and sear sub-assembly used in small arms of the type capable of sustained automatic fire and commonly referred to as a sub-machine gun or machine pistol.

An important object of the invention is to provide an integrated sub-assembly that is susceptible of economical mass production and in which the principles of reproduceability and interchangeability are carried to the highest degree.

This latter object has been attained by fabricating the sub-assembly mainly from stamped parts having relatively plain conformation thus resulting in the elimination of tedious and time-consuming operations.

The present invention is intended for use with guns of the character shown in application Serial No. 533,566, filed May 1, 1944, and now abandoned, entitled "Automatic Firearm" of which this application is a division.

The exact nature of the invention as well as other objects and advantages thereof will be apparent from consideration of the following specification relating to the drawings in which:

Figure 1 is a right side elevation of the assembled weapon;

Figure 2 is an enlarged sectional view through the weapon, some parts being omitted and others illustrated in elevation;

Figures 3 and 4 are fragmentary views similar to Figure 2 but showing the trigger and sear sub-assembly in different stages in the cycle of operation;

Figure 5 is an exploded view of the trigger and sear sub-assembly; and

Figure 6 is a section through line 6—6 of Figure 1 showing the manner in which the pivots for the sub-assembly are detachably held in place.

The main frame of the weapon comprises two stamped halves joined by welding or other convenient manner to form a substantially cylindrical receiver 1 having a depending hand grip portion 2 and depending side walls 42 and 43 and a magazine housing 3. The open forward end of the receiver is completed by welding or otherwise securing therein an internally threaded barrel sleeve 4 receiving a barrel 5.

Further description of the weapon is contained in parent application Serial No. 533,566, the present disclosure being limited to the trigger and sear sub-assembly which will be now described and, in so far as applicable, the various parts will be identified by the same reference numerals used in the parent application.

The trigger and sear sub-assembly comprises

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a conveniently integrated mechanism, and as shown in Figure 5, it consists of a trigger 24 pivoted to one end of a link 25, a sear 26 pivoted to the other end of the link 25, a spring 27 connected to said trigger 24 and link 25, a U-shaped clip 28 and a pivot pin 30.

The trigger 24 is a substantially U-shaped sheet metal stamping having a pair of diverging arms. The bottom forward portions of the diverging arms are integrally connected by a bridging portion to form a finger grip for the trigger. Each of these arms is provided with a pair of pivot openings 24' and 25', Figures 2 and 5, and portions 24'', in the vicinity of each pivot opening 24', offset from the main body of the arm. These offset portions 24'' lie in planes parallel to the depending sides 42 and 43 of the receiver and bear against these sides to prevent side play of the trigger 24 in the receiver 1.

The sear block 26 is provided with an upper pivot aperture 26' to receive a pivot pin 30, a lower pin opening 26'', a rearwardly extending step 29, and a shoulder 31.

The link 25 is a channel-shaped sheet metal stamping provided at each end thereof with longitudinally extending arms provided at one end with openings 25' and at the opposite end with openings 26''.

The trigger 24 and the link 25 are also provided with integral stamped out ears 27' and 27'', respectively, to which the ends of the tension spring 27 are attached.

The trigger 24 is pivoted to the link 25 through a pair of rivet pins 25'' and the link 25 to the sear 26 through a single headed pin 30', to thereby form a unitary linkage system for a purpose to be described.

An elongated U-shaped rod-like clip 28 is provided with a rear arm 28' and a forward arm 28''.

As shown in Figures 1 and 6, the main portion of the clip 28 rests against the outside of the wall 42. One of the arms 28' of the clip is inserted through aligned openings 2' in the walls 42 and 43 and the other arm 28'' through aligned openings 2'' all for a purpose to be explained. The clip 28 is locked in place by a housing 44 which, as shown in Figures 1 and 6 covers a portion of element 28. The arm 28' is the pivot for the trigger 24 and the arm 28'' a stop to limit clockwise movement of the sear 26 by acting against the sear step 29.

The receiver 1 has in the lower portion thereof an opening which is defined by the rear wall of the magazine housing 3, the depending receiver side walls 42 and 43 and a bottom wall 43' on

that portion of the receiver forming a housing for the trigger and sear sub-assembly. This opening is closed by a detachable sheet metal housing 44 which is provided at its front end with a tongue 45 engaging a slot 45' in the magazine housing 3, at its rear end with a tongue 46 for engaging a slot 46' in the trigger and sear sub-assembly housing and an aperture 47 adapted to register with a similar aperture 48 in said wall 43'. A detachable trigger guard 49 formed of flexible material, is provided at one end with shoulders 49' and an arched tongue 50 which extends through the apertures 47 and 48 into engagement with the inner surface of the bottom receiver wall 43', and at its other end with a tongue 51 which is snapped into an aperture 51' in the hand grip 2 and thereby secures the housing 44 against the receiver walls 42, 43 and 43'. As the side walls of the housing 44 overlap the depending receiver walls, it is provided with indentations 41' and 41'' to provide securing recesses for the forward ends of the clip 28 and the ends of the pivot pin 30, and thus serve as retainers for the elements 28 and 30 of the sub-assembly, the removal of the housing enabling these parts to be removed with great facility.

To install the trigger and sear sub-assembly, the parts are first connected together as shown in Figure 5. The receiver 1 is then turned upside down and the trigger and sear sub-assembly dropped through the bottom opening formed when the housing 44 is removed. The openings 24' are aligned with the openings 2' on the receiver sides 42 and 43 and the arm 28' of the clip 28 inserted through these pairs of aligned openings 2' and the other arm 28'' of the clip 28 is placed through the openings 2'' and extends across the receiver 1 to engage the rearwardly extending step 29 on the sear 26 to limit movement thereof. The sear 26 likewise is aligned, with its opening 26' to register with the openings 42' in the receiver walls 42 and 43, and the pin 30 inserted whereupon the shoulder 31 is impelled by the link 25 and the spring 27 to extend in a position to engage the shoulder 32 on the bolt 10. To disassemble, the trigger guard 49 is forced out of aperture 51' and rotated out of apertures 47 and 48, the housing 44 removed and the pin 28 pulled away from the receiver and the sear pin 30 forced out of its openings. The gun is then turned upside down, tipped forwardly and then right side up so that the trigger and sear sub-assembly will drop out of the bottom opening of the receiver.

To operate, the trigger 24 is pulled against the tension of the spring 27, causing it to pivot about the arm 28', of the U-shaped clip 28, to move the link forwardly to rotate the sear 26 on the pin 30 in a counterclockwise direction causing the sear shoulder 31 to drop beneath the bolt shoulder 32, as shown in Figure 4, permitting the bolt 10 to be moved forwardly by the driving springs 17.

If the trigger is held depressed, as shown in Figure 4, the bolt 10 will continue to reciprocate until the ammunition is exhausted. Short bursts or single shots, however, can be fired by releasing the trigger when desired in which case the spring 27 will pivot the trigger 24 and the link 25 towards each other, as a result of which the link 25 will pivot the sear 26 in a clockwise direction until the step 29 abuts the arm 28'' as shown in Figures 2 and 3. In this position, the shoulder sear 31 is projected into the path of the reciprocating bolt 10 which, as it moves backwards in recoil, will ride over the shoulder 31 cousing the sear 26 to rotate on the pin 30 to the position shown in Figure 4, forcing the link 25 to pivot away from the trigger 24 against the tension of the spring 27.

As soon as the bolt shoulder 32 has been carried to the rear to clear the sear shoulder 31, it will be raised into the path of the bolt shoulder 32 by the action of the spring 27, always tending to maintain the trigger 24 and the link 25 pivoted towards each other. When the bolt 10 has completed its recoil movement and has commenced its forward movement preparatory for the next firing cycle, its shoulder 32 will strike the sear shoulder 31, as shown in Figure 2 and be held against further forward movement in this cocked position until the trigger is operated again.

We claim:

1. In a firearm, the combination of a receiver having an opening in the bottom thereof, a bolt reciprocable in said receiver, and a subassembly comprising a trigger, a rotatable sear including an integral step, a link pivoted to said trigger and said sear whereby rotation of the trigger rotates the sear in a first direction to release the bolt for forward movement, said link comprising a channel shaped member provided at each end thereof with a pair of longitudinally extending arms, one pair of said arms received within said trigger and the other pair of said arms straddling the said sear, spring means between said trigger and said link and a unitary means comprising a U-shaped clip one arm of said clip pivotally mounting said trigger in said receiver, the other arm of said clip cooperating with said step to limit rotation of said sear in a second direction, said subassembly being insertable in and removable from said receiver through said opening as a unit.

2. In a firearm a subassembly comprising a rotatable trigger having a free end, a link at the opposite end thereof pivotally secured to said trigger, a sear having an integral step pivotally secured to the other end of said link whereby rotation of said trigger rotates said sear, a spring engaged between said trigger and said link resisting such rotation, one end of said spring engaging said trigger between the free end thereof and the center of rotation, a clip having two laterally extending arms, one of said arms pivoting said trigger between the link and the spring, the other of said arms limiting the rotation of said sear by cooperation with said step, the said subassembly being insertable in and removable from the said firearm as a unit.

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