

Feb. 12, 1957

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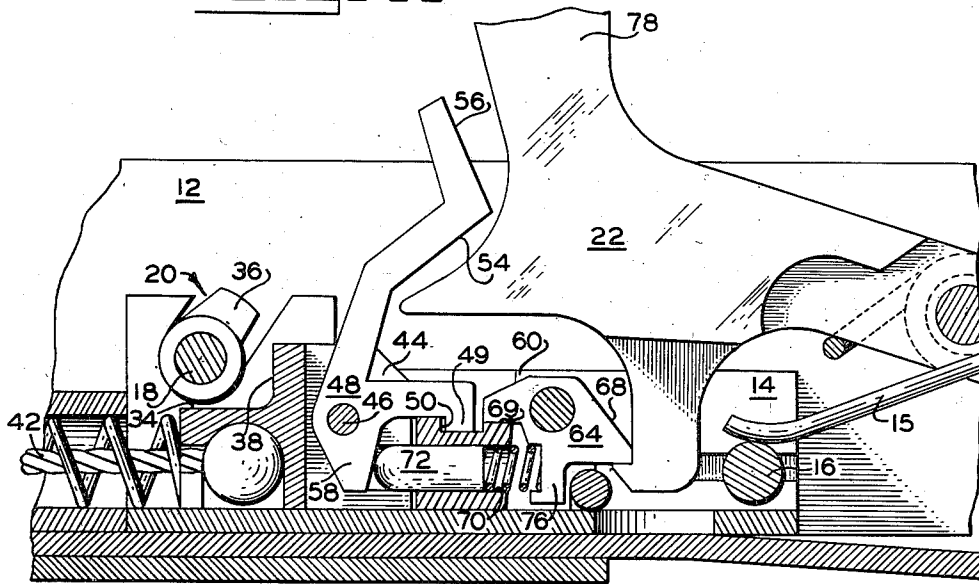
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FIRE CONTROL MECHANISM

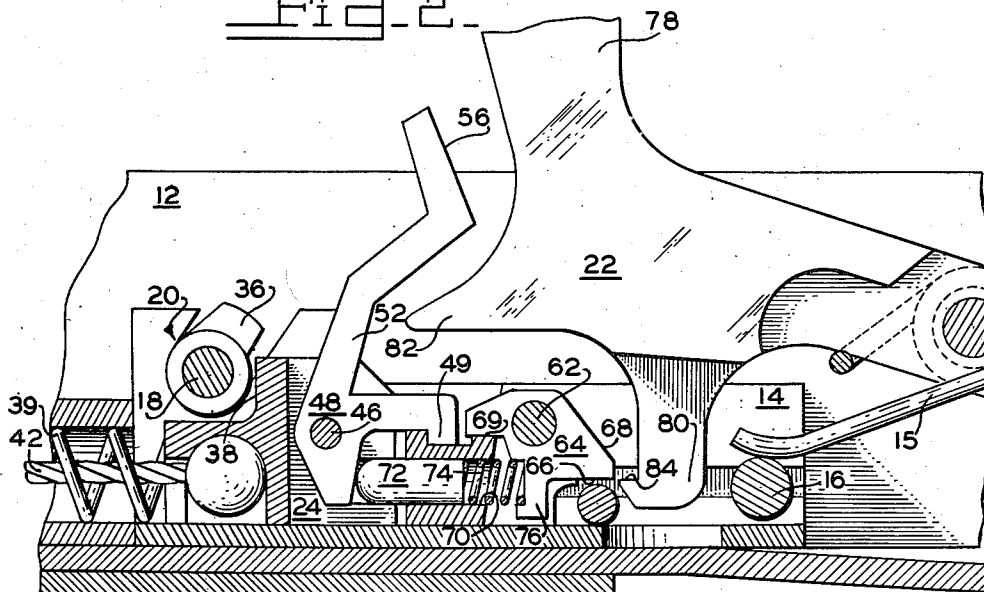
Filed Oct. 14, 1954

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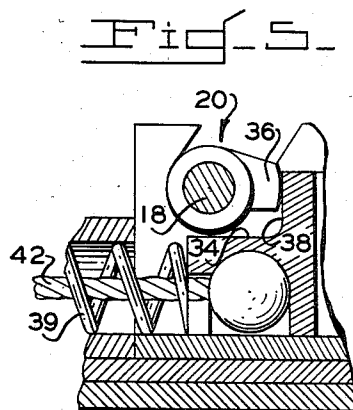
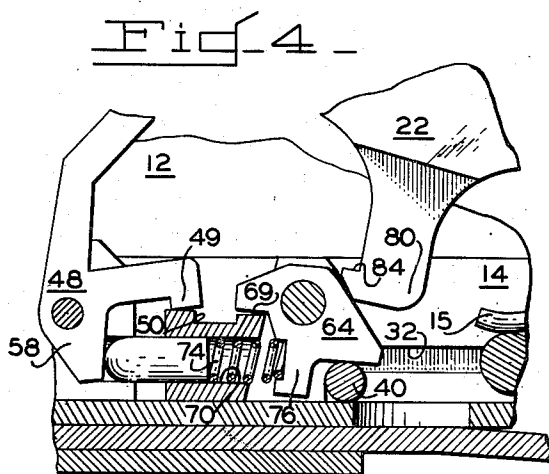
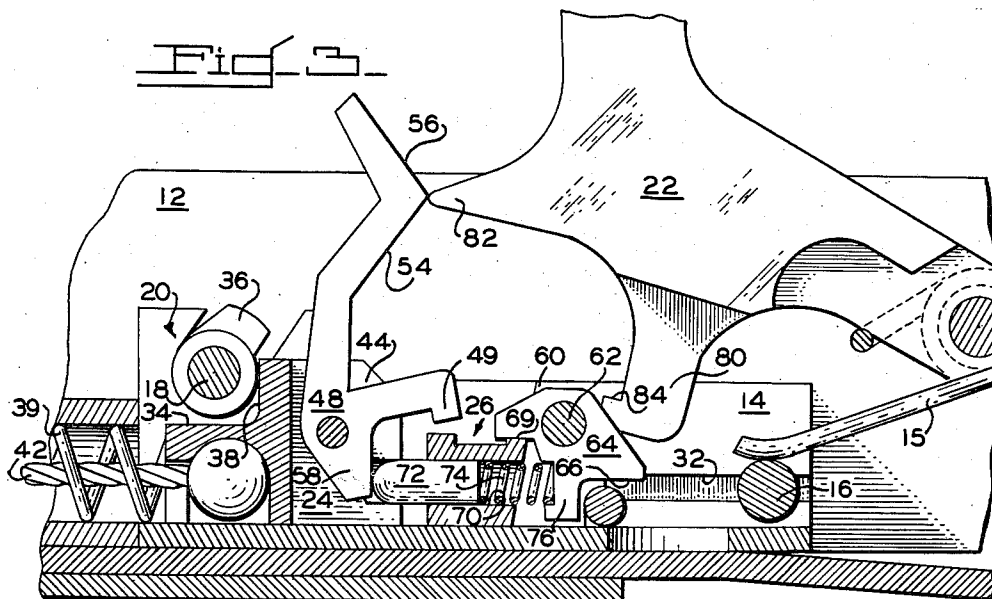
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FIRE CONTROL MECHANISM

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3 Sheets-Sheet 2



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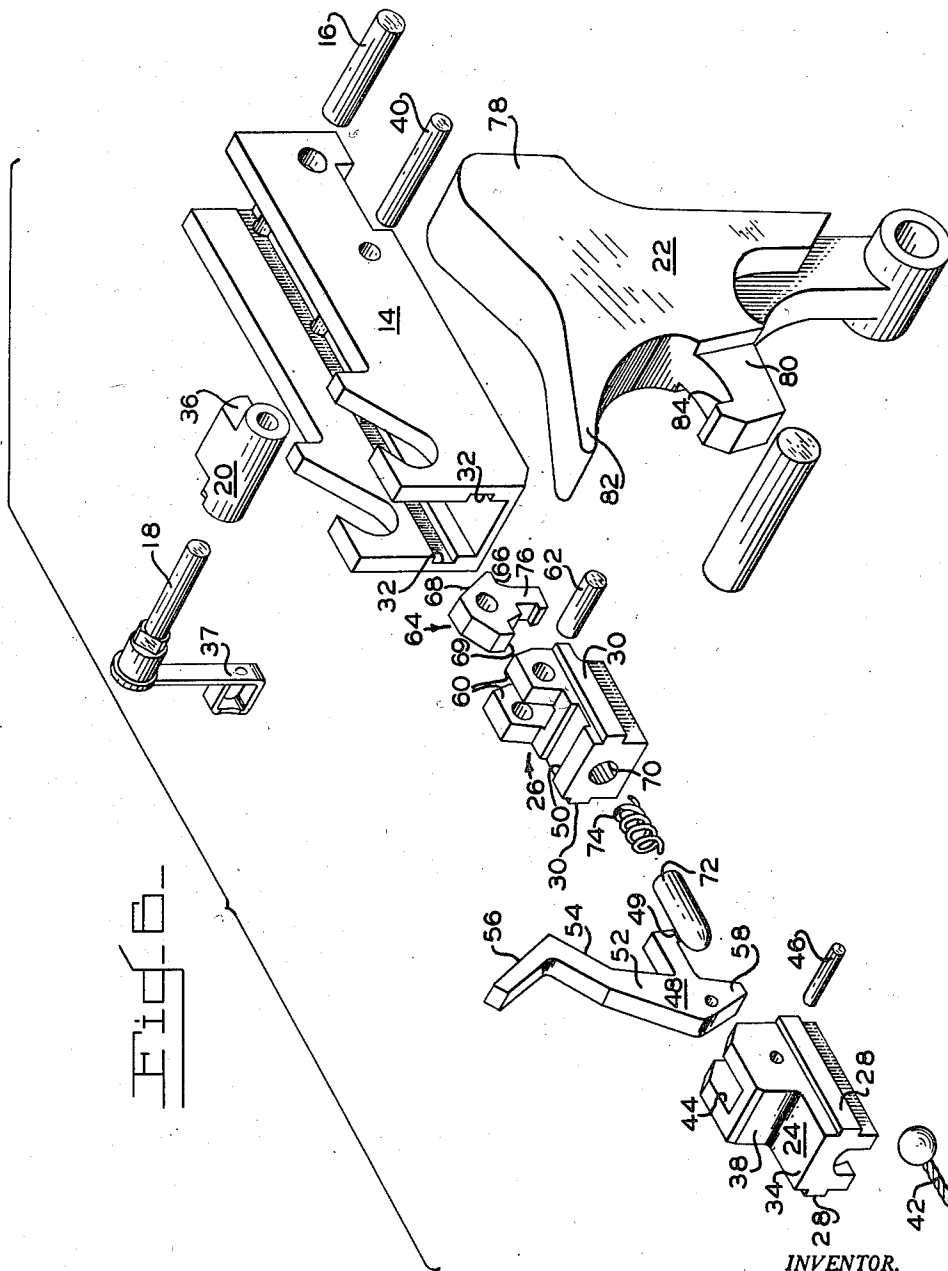
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FIRE CONTROL MECHANISM

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3 Sheets-Sheet 3



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FIRE CONTROL MECHANISM

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Application October 14, 1954, Serial No. 462,405

6 Claims. (Cl. 89—154)

(Granted under Title 35, U. S. Code (1952), sec. 266)

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

This invention relates to trigger mechanisms for semi-automatic firearms and more particularly to trigger mechanisms of in-line operation.

It is an object of this invention to provide a trigger mechanism wherein the sear is released by a short trigger pull.

It is another object of this invention to provide a trigger mechanism for semi-automatic firearms wherein the hammer is positively reengaged by the sear when recoiled to cock position.

It is a further object of this invention to provide a trigger mechanism for semi-automatic firearms which is rugged in construction and positive in operation.

The specific nature of the 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 longitudinal cross-sectional view of the trigger mechanism of this invention showing the hammer engaged in cock position by the sear;

Fig. 2 is a view similar to Fig. 1 but showing the sear retracted to release the hammer;

Fig. 3 is a view similar to Figs. 1 and 2 but showing the actuator block released from the sear carrier by the hammer during movement to fire position;

Fig. 4 is a fragmentary longitudinal cross-sectional view showing the sear partly pivoted by the hammer to unlatch position during movement thereof to cock position;

Fig. 5 is a fragmentary longitudinal cross-sectional view showing the safety device in safe position; and

Fig. 6 is a perspective exploded view of the trigger mechanism of this invention.

Shown in the figures is a firearm receiver 12 and a substantially U-shaped channel member 14 removably mounted therein by means of a retaining pin 16 and a mounting pin 18 which also serves as a bearing for a safety 20 linked thereto for rotational movement between a "safe" and an "off" position. A hammer 22 is mounted forwardly of channel member 14 in receiver 12 for pivotal movement between a rearward cock position and an upward fire position and is arranged to be pivoted to cock position by recoil of the firearm bolt (not shown). A spring 15 biases hammer 22 from cock to fire position.

Mounted for slidable movement in channel member 14 is an actuator block 24 and a sear carrier 26 forwardly thereof. Such sear carrier and actuator block are provided with longitudinal tongue portions, 28 and 30 respectively, which protrude from the sides thereof for slidable engagement with a pair of longitudinal grooves 32 which extend along the insides of the vertical walls of channel member 14. The upper rear portion of actuator block 24 is cutaway to form a right angle cross-section, as noted at 34, for receiving safety

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20. Such safety is provided with a radially projecting lug portion 36 which is rotatable into engagement with the forward vertical wall 38 of cutaway portion 34 when mounting pin 18 is rotated by a handle 37 attached thereto to "safe" position.

A compressible coil spring 39 bears against the rear end of actuator block 24 to urge such actuator block against sear carrier 24. The forward movement of sear carrier 26 is stopped by a transverse pin 40 mounted through channel member 14 and receiver 12. Actuator block 24 is arranged to be pulled rearwardly by a lanyard 42 attached thereto, such rearward movement being controlled by safety 20 which, when rotated to "safe" position, lug 36 thereon engages wall 38 to hold the actuator block immovable against sear carrier 26 and permits limited reciprocal movement of the sear carrier and actuator block when such lug is rotated out of engagement with such wall when the safety is moved to "off" position.

Provided in the front end of actuator block 24 is a vertical channel 44 in which a connector member 48 is mounted for pivotal movement on a transverse pin 46. Such connector member includes a forwardly extending hook portion 49 which is receivable by a transverse groove 50 in the top side of sear carrier 26 for releasably connecting such sear carrier to the actuator block for unitary movement. Also, an upwardly extending arm portion 52 provided with an upwardly and forwardly inclining cam surface 54 and an inclined surface 56 which extends upwardly and rearwardly therefrom. Such hook and arm portions are located above pin 46. A depending lug portion 58 extends from connector member 48 below pin 46. When hook 49 is disengaged from groove 50 and sear carrier 26 and actuator block 24 are separated, such hook portion is slidably engaged with the top of the sear carrier rearward of such groove.

Extending upwardly from the front portion of sear carrier 26 is a pair of laterally spaced ears 60 which are drilled to receive a transverse shaft 62 upon which there is mounted for pivotal movement a sear 64. Such sear is provided with a forwardly extending, downwardly facing latch portion 66 from the front end of which a cam surface 68 extends upwardly and rearwardly. An overhanging portion 69 projects rearwardly from sear 64 to be engageable with the top side of sear carrier 26 when latch portion 66 is parallel with the longitudinal axis of channel member 14 and whereby such latch portion is permitted to be pivoted away from such longitudinal position only in a downward direction.

Extending longitudinally through sear carrier 26 is a bore 70 and slidably mounted therein is a plunger 72 which projects therefrom to engage lug portion 58 of connector 48. A compressible coil spring 74 is mounted in bore 70 forwardly of plunger 72 and is arranged to bear resiliently against such plunger and a lug portion 76 depending from sear 64 below shaft 62. Whereby, connector 48 is pivoted to resiliently press hook portion 49 and overhanging portion 69 simultaneously against the top of sear carrier 26.

Extending from hammer 22 rearward of a striker head portion 78 thereof is a leg portion 80 and an arm portion 82 at right angles thereto. Leg 80 is arranged to extend downwardly in front of sear carrier when hammer 22 is in cock position. Arm portion 82 at the same time is arranged to extend rearwardly over sear carrier 26 for cooperable engagement with arm portion 52 of connector 48, as hereinafter described, when sear carrier 26 is in forward position, but to pass freely thereby when such sear carrier is in the rearward position. Projecting from the end of leg portion 80 is a shelf 84 the top of which matingly engages latch por-

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tion 66 of sear 64 when hammer 22 is in cock position and sear carrier 26 is engaged with pin 40 and is disengaged therefrom when such sear carrier and actuator block 24 are pulled rearwardly by lanyard 42 to their rearmost positions.

Operation

To fire the firearm in which the trigger mechanism of this invention is incorporated, the firearm is charged by retracting the bolt thereof (not shown) whereby hammer 22 is pivoted to cock position, winding spring 15. When hammer 22 is in cock position, shelf 84 thereon is in full engagement with latch portion 66 of sear 64 with the engagement of overhanging portion 69 of sear 64 against the top of sear carrier 26 preventing the pivoting of such sear to unlatch such hammer, and such latch portion is pressed forwardly into engagement with such shelf through the bias of spring 39 against actuator block 24.

Lanyard 42 is then pulled to draw actuator block 24 attached thereto rearwardly, and as such actuator block is joined to sear carrier 26 by means of connector 48, such sear carrier is drawn rearwardly also, disengaging latch portion 66 of sear 64 from shelf 84 of hammer 22. When disengaged from sear 64, hammer 22 is biased to fire position by the wound spring 15.

During the initial movement of hammer 22, arm portion 82 thereon engages cam surface 54 to cammingly pivot connector 48 so that hook portion 49 thereof is disengaged from groove 50 of sear carrier 26. Thus, sear carrier 26 is disengaged from actuator block 24 and free to be returned to normal position against pin 40, ready to relatch hammer 22 by the bias of spring 74. On the ensuing recoil of the firearm bolt (not shown), following the firing of the firearm, hammer 22 is pivoted thereby, as already explained, to cock position with shelf 84 thereof engaging cam surface 68 of sear 64 to tilt latch portion 66 thereof downward against the bias of spring 74, permitting such shelf to pass by such latch portion for reengagement therewith.

If by chance the operator should release lanyard 42, permitting actuator block 24 to be returned to forward position against sear carrier 26 before hammer 22 is pivoted to cock position, arm 52 will be moved out of the way of the passing arm portion 82 of such hammer by the camming engagement thereof with inclined surface 56. When lanyard 42 is released, permitting actuator block 24 to be biased forwardly by spring 39, hook portion 49 of connector 48, which has been slidably engaged with the top side of sear carrier 26, slides forwardly to be received by groove 50 and thereby engages sear carrier 26 to actuator block 24 ready to be pulled rearwardly by lanyard 42 to fire another round.

From the foregoing it is clearly apparent that there is herein provided a novel trigger mechanism of in-line operation which has a short trigger pull, is of positive operation and is simple and rugged in construction.

Although a particular embodiment of the invention has been described in detail herein, it is evident that many variations may be devised within the spirit and scope thereof and the following claims are intended to include such variations.

I claim:

1. In a firearm having a receiver, a trigger mechanism including a hammer pivotally mounted in the receiver for reciprocation between a cock position and a fire position, a channel member fixedly mounted in the receiver rearwardly of said hammer and provided with longitudinal grooves therealong, a sear device for releasably holding said hammer in said cock position mounted for slidable movement along said groove, sear actuating means mounted for slidable movement along said groove rearwardly of said sear device, connector means for releasably engaging said sear device to said sear actuating means, and an arm on said hammer cammingly cooperable with said connector means for disengaging said sear

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device from said sear actuator means during movement of said hammer from said cock position to said fire position.

2. In a firearm having a receiver, a trigger mechanism including a hammer pivotally mounted in the receiver for reciprocation between a cock position and a fire position, a channel member fixedly mounted in the receiver rearwardly of said hammer and provided with longitudinal grooves therealong, a sear device mounted for sliding movement along said grooves between a latch position wherein said hammer is releasably held in said cock position and an unlatch position, means for biasing said sear device to said latch position, sear actuator means mounted in said channel member rearwardly of said sear device for sliding movement along said grooves, resilient means for biasing said sear actuator means towards said sear device, connector means for releasably engaging said sear actuator means to said sear device whereby said sear device is movable by said sear actuator means to said unlatch position, and an arm on said hammer cammingly cooperable with said connector means during movement of said hammer from said cock position to said fire position for disconnecting said sear device from said sear actuator means whereby said sear device is returnable to said latch position by said means for unlatching said hammer when actuated to said cock position.

3. In a firearm having a receiver, a trigger mechanism including a hammer pivotally mounted in the receiver for reciprocation between a cock position and a fire position, a sear device mounted in the receiver for reciprocal longitudinal movement between a latch position wherein said hammer is releasably held by said sear device in said cock position and an unlatch position, sear actuator means mounted for reciprocal longitudinal movement in the receiver, a spring for biasing said sear actuator means toward said sear device, means for moving said sear actuator against the bias of said spring, a connector mounted to said sear actuator means for pivotal movement on a pin transversely therethrough, said connector being provided with an arm having a cam surface and a projecting hook portion disposed above said pin and a lug portion depending below said pin, said hook portion being engageable with a groove in said sear device for releasably connecting said sear device to said sear actuator means, a coil spring mounted between said sear device and said lug for simultaneously biasing said sear device to said latch position and said hook portion into engagement with said groove, and an arm portion projecting from said hammer for engagement with said cam surface during actuation from said cock position to said fire position for pivoting said connector to disengage said hook from said groove whereby said sear device is disconnected from said sear actuator means for the return of said sear device to said latch position by said coil spring to relatch said hammer when actuated to said cock position.

4. In a firearm having a receiver, a trigger mechanism including a hammer pivotally mounted in the receiver for reciprocation between a cock position and a fire position, a sear carrier mounted in the receiver for reciprocal longitudinal movement between a forward position and a rearward position, a sear having a latch portion mounted in said carrier for pivotal movement between a latch position wherein said latch portion is disposed parallel to the longitudinal axis of said sear carrier and an unlatch position wherein said latch portion is inclined downwardly, an overhanging portion extending rearwardly from said sear for engagement with said sear carrier to prevent pivoting of said sear upwardly away from said latch position, a shelf extending from said hammer for engagement with said latch when said hammer is in said cock position and said sear carrier is in said forward position, a sear actuator mounted in the receiver rearwardly of said sear carrier for reciprocal longitudinal movement, a spring for biasing said actuator forwardly toward said sear carrier, actuating

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means for moving said sear actuator against the bias of said spring, connector means for releasably engaging said sear carrier to said sear actuator, an arm on said hammer cammingly cooperable with said connector means for releasing said sear carrier from said sear actuator, and spring means for simultaneously biasing said carrier to said forward position when released from said sear actuator and said sear to said latch position.

5. In a firearm having a receiver, a trigger mechanism including a hammer having a leg portion and an arm portion at right angles thereto, said hammer being pivotally mounted in the receiver for reciprocation between a cock position wherein said leg portion extends downwardly and said arm portion extends rearwardly therefrom and an upward fire position, a shelf portion extending from said leg portion toward said arm portion parallel with the longitudinal axis of the receiver when said hammer is in said cock position, a sear carrier mounted in the receiver for longitudinal movement between a forward position and a rearward position, a sear having a latch portion mounted to said sear carrier for pivotal movement between a latch position wherein said latch portion is engageable with said shelf portion when said hammer is in said cock position and said carrier is in said forward position and a downward unlatch position wherein said shelf portion is passable thereby for engagement with said latch portion, an actuator member mounted in said receiver rearwardly of said carrier for reciprocal longitudinal movement, said actuator being normally biased by a spring toward said carrier, means for moving said actuator against the bias of said spring, a connector rotatably mounted to said actuator for releasable engagement with said carrier whereby said carrier is movable to said rearward position by said actuator, said connector being provided with a cam portion engageable by said arm portion during movement of said hammer from said cock position to said fire position for pivoting said connector to disengage said carrier from said actuator, and spring means cooperating with said sear and said connector for simultaneously biasing said sear to said latch position, said carrier to said forward position and said connector into engagement with said carrier.

6. In a firearm having a receiver, a trigger mechanism including a hammer provided with an arm portion and a leg portion at right angles thereto having a shelf projecting therefrom toward said arm portion, said ham-

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mer being pivotally mounted in said receiver for reciprocation between a cock position wherein said leg portion extends downwardly and said arm portion rearwardly therefrom and an upward fire position, a sear carrier mounted in said receiver rearwardly of said hammer for reciprocal longitudinal movement between a forward position and a rearward position, a sear provided with a latch portion mounted for pivotal movement between a latch position wherein said latch portion is engageable with said shelf portion when said hammer is in said cock position and said carrier is in said forward position and a downward position wherein said shelf portion is passable thereby during movement of said hammer to said cock position for latching with said latch portion, an overhanging portion extending from said sear for engagement with said carrier to prevent the pivoting of said latch portion upwardly away from said latch position, an actuator mounted in said receiver rearwardly of said carrier for reciprocal longitudinal movement, spring means for biasing said actuator forwardly toward said carrier, actuating means for pulling said actuator against the bias of said spring means, a connector mounted for pivotal movement on a transverse pin through said actuator, said connector being provided with an arm and a hook disposed above said pin and a lug portion projecting below said pin, said hook being receivable by a groove in said carrier for releasably engaging said actuator thereto, said arm being provided with a cam surface engageable by said arm portion of said hammer during movement thereof from said cock position to said fire position for pivoting said connector to disengage said hook from said groove and an inclined surface extending from said cam surface for engagement by said arm portion of said hammer during movement thereof from said fire position to said cock position for cammingly moving said arm portion out of the way thereof, and a spring mounted between said lug and a depending portion of said sear for simultaneously biasing said carrier to said forward position, said sear to said latch position and said hook into engagement with said carrier.

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