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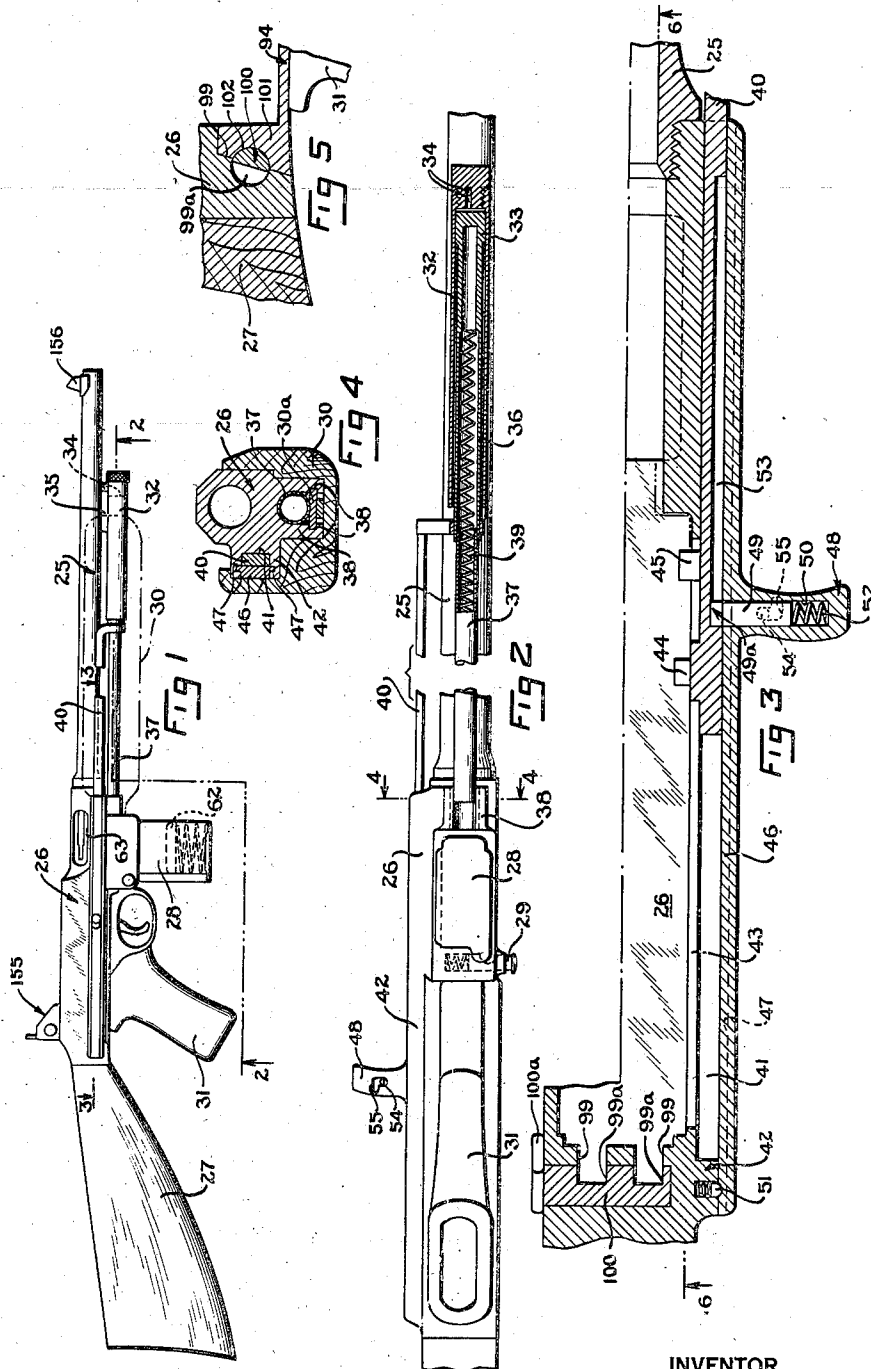
G. J. HYDE

2,407,157

FIREARM

Filed June 14, 1941

4 Sheets-Sheet 1



INVENTOR
George J. Hyde
BY F. Bascom Smith
ATTORNEY

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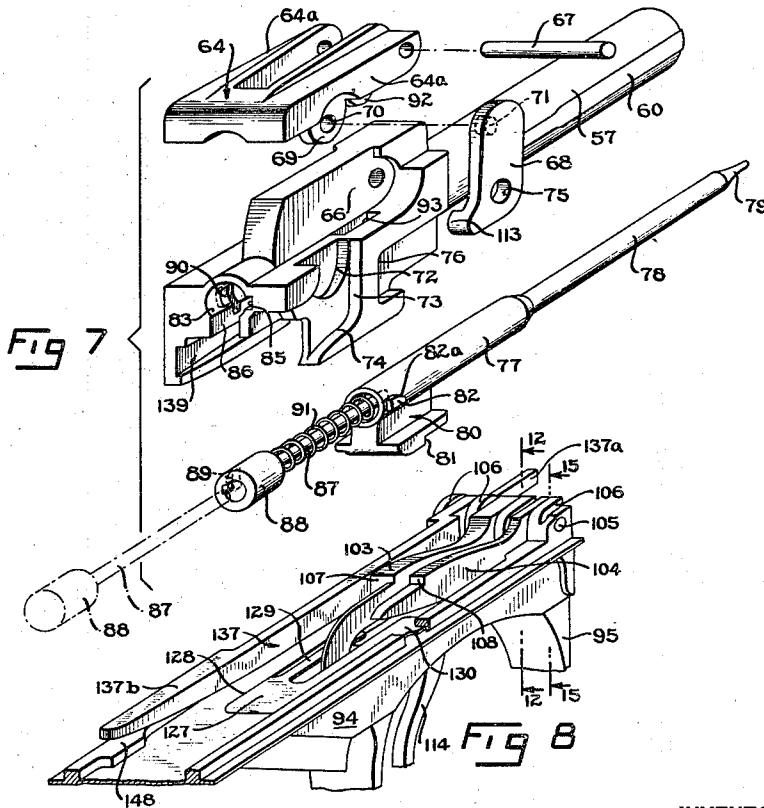
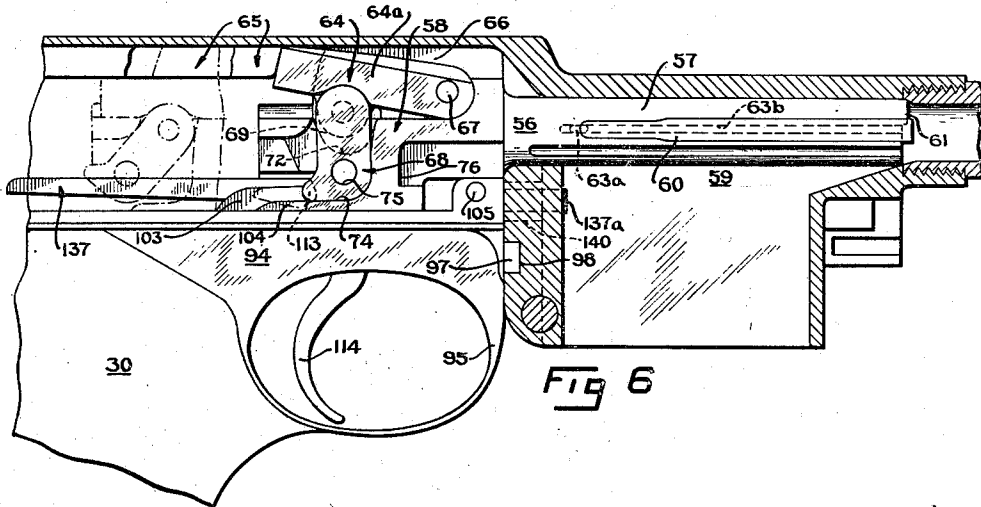
G. J. HYDE

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FIREARM

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4 Sheets-Sheet 2



INVENTOR
George J. Hyde
BY F. Lascom Smith
ATTORNEY

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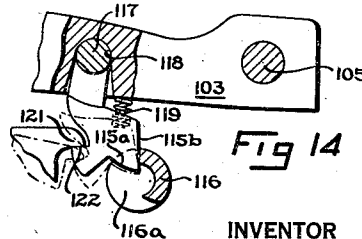
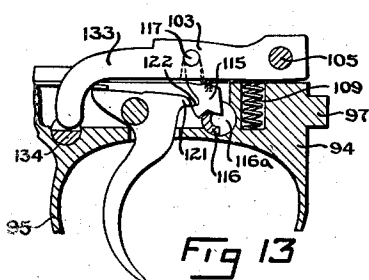
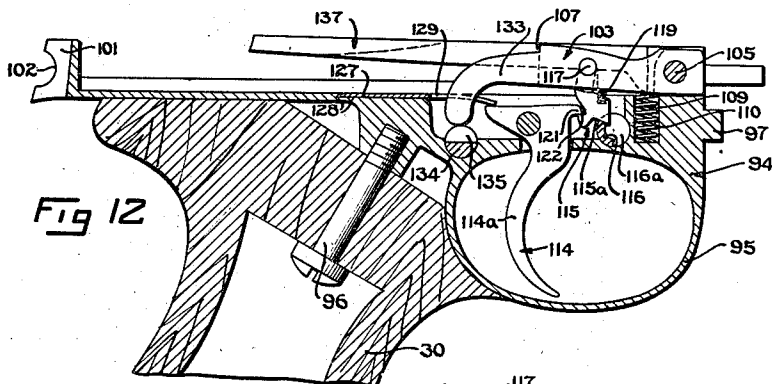
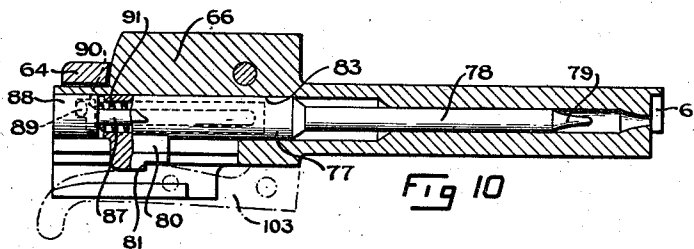
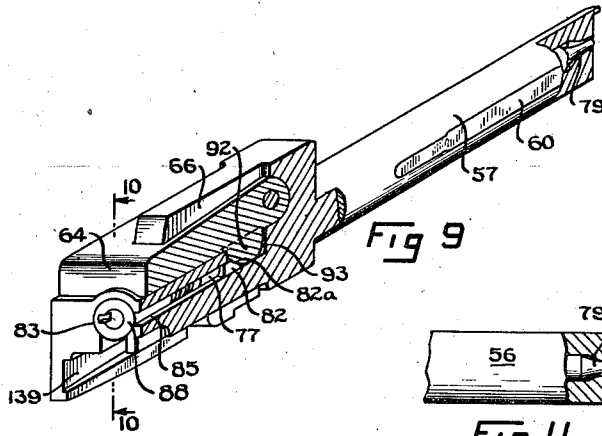
G. J. HYDE

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FIREARM

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4 Sheets-Sheet 3



INVENTOR
George J. Hyde
BY
F. Bascom Smith
ATTORNEY

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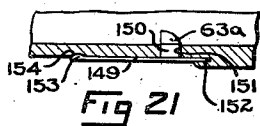
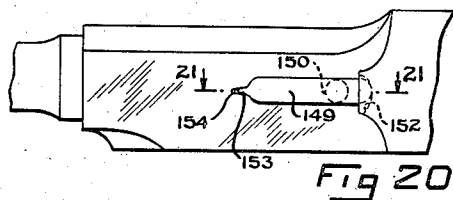
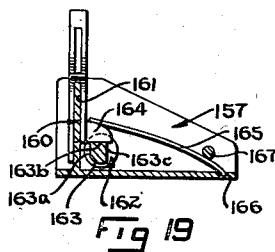
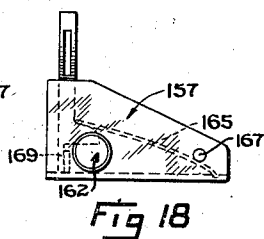
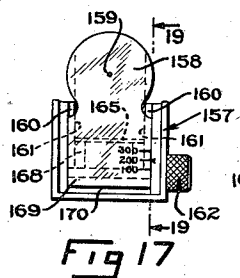
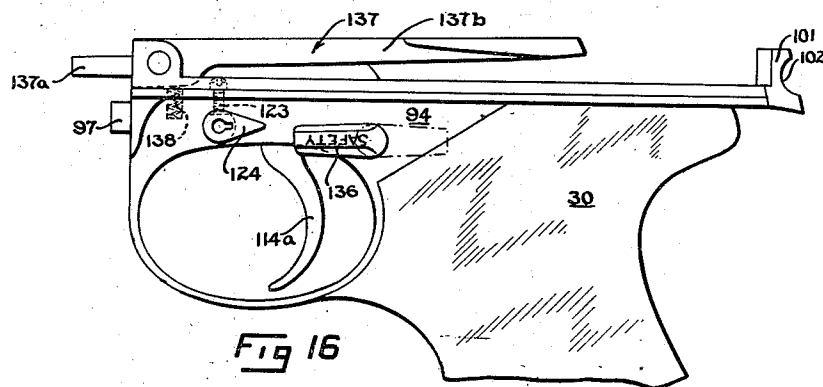
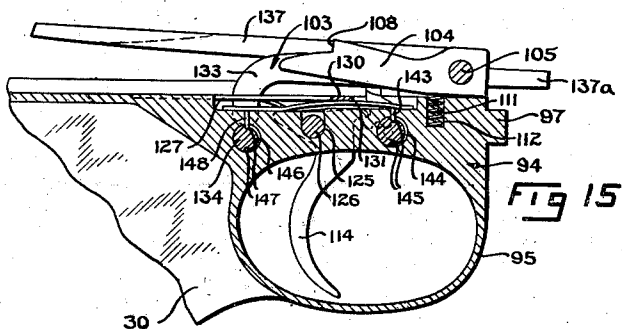
G. J. HYDE

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FIREARM

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4 Sheets-Sheet 4



INVENTOR
George J. Hyde
BY F. Bascom Smith
ATTORNEY

UNITED STATES PATENT OFFICE

2,407,157

FIREARM

George J. Hyde, Brooklyn, N. Y., assignor to Firearms Research Corporation, New York, N. Y., a corporation of New York

Application June 14, 1941, Serial No. 398,034

3 Claims. (Cl. 42—3)

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This invention relates to firearms, and more particularly to rifles.

An object of the present invention is to provide a novel light weight rifle adapted for automatic or semi-automatic firing.

Another object is to provide a novel automatic means for actuating the reloading mechanism of a rifle.

A further object is to provide a rifle having a novel bolt and firing pin mechanism and a novel loading mechanism rendered operable automatically or manually.

Still another object is to provide a novel trigger mechanism for a firearm.

A further object is to provide a rifle with novel safety devices for controlling the operation of the firing mechanism.

A still further object is to provide a rifle having a retractable bolt with novel means for positively locking the bolt in firing position.

Another object is to provide the above rifle with novel means adapted to prevent firing unless the bolt is locked in firing position.

A still further object is to provide an automatic rifle with novel firing pin release means rendered operable by the locking of the bolt in firing position.

Another object is to provide a novel sighting mechanism for a firearm, such as a rifle.

The above and further objects and novel features of the invention will more fully appear from the following detailed description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only and are not intended as a definition of the limits of the invention, reference for this latter purpose being had primarily to the appended claims.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 is a view in side elevation of a rifle embodying the present invention, the forward grip thereof being shown in broken lines;

Fig. 2 is a view partly in section and with parts broken away taken substantially along line 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional view of the rifle receiver with the bolt and trigger mechanisms removed therefrom, the view being taken substantially along line 3—3 of Fig. 1;

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

Fig. 5 is a detail sectional view of a device

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adapted to operatively secure the trigger mechanism relative to the receiver;

Fig. 6 is a sectional view of the receiver taken along line 6—6 of Fig. 3, the bolt and trigger mechanisms being operatively positioned in said receiver;

Fig. 7 is an exploded perspective view of the parts of the bolt mechanism;

Fig. 8 is a perspective view, with parts broken away, of the trigger mechanism;

Fig. 9 is a perspective view of the assembled bolt mechanism, with a section thereof broken away along a longitudinal plane to illustrate the operation of a safety control for the firing pin;

Fig. 10 is a sectional view taken substantially along line 10—10 of Fig. 9, and showing the firing pin in cocked position;

Fig. 11 is a fragmentary view, partly in section, of the firing end of the bolt with the firing pin in firing position;

Fig. 12 is a sectional view of the trigger mechanism, said view being taken along a longitudinal plane through line 12—12 of Fig. 8 and illustrating the sear and the control mechanism therefor;

Fig. 13 is a sectional view of a portion of Fig. 12, showing the trigger and sear in firing position;

Fig. 14 is an enlarged view of the sear control mechanism when the latter is set for automatic firing;

Fig. 15 is a sectional view, with parts broken away, taken substantially along a longitudinal plane through line 15—15 of Fig. 8;

Fig. 16 is a view in side elevation, with parts broken away, of the trigger mechanism;

Fig. 17 is a view in rear elevation of the sight;

Fig. 18 is a view in side elevation of said sight;

Fig. 19 is a sectional view taken substantially along line 19—19 of Fig. 17;

Fig. 20 is a fragmentary view in elevation of the rifle magazine, showing a novel means for mounting the cartridge ejecting lug; and

Fig. 21 is a sectional view taken substantially along line 21—21 of Fig. 20.

As illustrated, the rifle embodying the present invention is of the shoulder type and is adapted for selective automatic or semi-automatic firing, being provided with a self-loading mechanism. The rifle comprises a barrel 25 (Figs. 1, 2, and 6) threadedly secured to a receiver 26 and a stock 27 fixed to the rear end of said receiver. A box cartridge magazine 28 is operatively attached to the receiver, being held by means of a push-button device 29 of well-known construction. A forward hand grip or forearm 30, which serves

as a guard for parts more fully described hereafter, and a rear hand grip 31 are provided in conventional locations. A sling (not shown) may be suspended between stock 27 and grip 30.

The self-loading mechanism comprises a novel actuating means which includes a cylinder 32 (Figs. 1 and 2) having a piston 33 reciprocally mounted therein, the front end of said cylinder being connected by a passage 34 to the interior of barrel 25 at a point spaced from the end of said barrel. Cylinder 32 is preferably located beneath and parallel to said barrel, being secured thereto by a bracket 35. Passage 34 preferably extends through the end wall of the cylinder providing an expansion chamber in the cylinder even when the piston is at the end of its travel. A hollow piston rod 36 secured at one end to said piston is slidably mounted at the other end on a hollow guide rod 37, the latter being supported at its free end by a bracket 38 fixed to receiver 26. A compressed coil spring 39 is contained within rods 36 and 37 and acts to move piston 33 in the direction of the cylinder head. Forearm 30 covers and guards the moving parts connected to cylinder mechanism 32, 33 and is supported at one end by bracket 38, the latter having a pair of grooves 38a (Fig. 4) formed therein for receiving a plate member 30a fixed to said forearm. The other end of said forearm is secured to the barrel 25.

To transmit the motion of piston 33 to the mechanism in receiver 26, an arm or connecting rod 40 connected at one end to piston rod 36 extends rearwardly to said receiver and is slidably mounted for reciprocation in a groove 41 (Figs. 3 and 4) formed in a laterally projecting portion 42 of said receiver. Groove 41 extends longitudinally for substantially the entire length of the receiver and opens outwardly so that arm 40 may be readily positioned therein during assembly. A longitudinal slot 43 in the wall of the receiver connects groove 41 to the interior of the receiver and a pair of longitudinally spaced lugs 44 and 45 carried by arm 40 adjacent the end thereof extend through said slot into said receiver, said lugs being adapted to engage and actuate the reloading and firing mechanisms in the receiver in a manner more fully described hereafter.

To cover groove 41 so as to prevent foreign material from entering the receiver through slot 43 and to provide manual means for actuating the rifle mechanisms, a member 46 is slidably mounted in a pair of grooves 47 disposed in the side walls of groove 41 and has a handle 48 formed therewith. Slide 46 (Fig. 3) is connected to arm 40 by means of a retractable pin 49 mounted in a recess 50 in handle 48. A coil spring 52 in said recess urges said pin into engagement with the rear end of a slot 53 in arm 40, the tip 49a of said pin being formed with a pair of parallel sides spaced apart a distance equal to the width of said slot. A lug 54 mounted on the pin extends through a recess 55 in handle 48 and said lug and recess act as a bayonet joint whereby pin 49 may be held disengaged from slot 53. The latter extends forwardly from said pin so that movement of arm 40 to the rear will not be transmitted to slide 46 while rearward movement of the latter will retract said arm. A pin 51 (Fig. 3) resiliently mounted in a recess in the side wall of receiver portion 42 engages a recess in slide 46 and fixes the latter against inadvertent movement due to recoil and handling but does

not offer a sufficient resistance to materially affect the manual operation of said slide.

A novel bolt mechanism 56 comprising a cartridge-engaging cylindrical portion 57 (Fig. 6) and a rear block portion 58 is slidably mounted for reciprocation in receiver 26. Portion 57 extends into the cartridge chamber 59 of said receiver and is provided with a cantilever extractor spring 60 and an axially extending flange 61 for engaging a cartridge rim in the well-known manner during the forward motion of said portion into said chamber. Cartridges are fed into chamber 59 by magazine 23, the latter having a spring actuated follower 62 (Fig. 1) for moving the cartridges into said chamber. The spent cartridge shell is ejected through opening 63 (Fig. 1) in the receiver during the rearward motion of bolt mechanism 56, being engaged by a lug 63a (Figs. 6 and 21) extending into said receiver on the side thereof opposite said opening and being pivoted thereby about extractor spring 60. Lug 63a normally extends into a groove 63b in cylindrical portion 57.

Novel means for locking bolt mechanism 56 against movement during firing are provided and, as shown, comprise a member 64 (Figs. 6 and 7) pivotally mounted on block 58 adjacent the front end of the latter and extending rearwardly in receiver 26. When member 64 is held in elevated position, as shown in full lines in Fig. 6, said member engages the ends of a pair of laterally spaced shoulders or abutments 65 formed in said receiver and provides a positive lock for bolt 56. Member 64 comprises a pair of arms 64a which are integrally joined at the rear or receiver engaging end of said member and said arms are pivotally mounted on both sides of a vertically extending central portion 66 of block 58 by means of a pin 67. To retract bolt 56, member 64 must be lowered and to accomplish this a control link 68 is mounted for pivotal movement on one of arms 64a, a depending bracket 69 being preferably formed on said arm with an opening 70 therein for receiving a pin 71 carried by said link. A recess 72 in block 58 receives bracket 69 and an adjoining recess 73 receives link 68, the bottom wall 74 of the latter recess serving to support said link when the latter holds member 64 in elevated position and to guide said link during the pivotal movement thereof to control said member. An opening 75 (Fig. 7) in the lower half of control link 68 is adapted to be engaged by lug 44 on arm 40 (Fig. 3). Movement of arm 40 rearward pivots said link and depresses member 64, rendering bolt 56 free for rearward movement. Lug 45 (Fig. 3) on said arm is adapted to engage a shoulder 76 (Figs. 6 and 7) on said block to move the bolt after member 64 has been lowered.

A novel firing mechanism (Figs. 7, 9, and 10) is operatively mounted in bolt 56, being adapted to be rendered operable to fire a cartridge only when the bolt is in locked position. As shown, the mechanism comprises a hollow barrel 77 to which a longitudinally extending pin 78 having a firing tip 79 and a depending sear engaging member 80 are rigidly attached. Member 80 extends vertically downward and has a transverse cross-section in the shape of an inverted T, the lower surface of the horizontal arm of said T being provided with a tooth or shoulder 81. A lug 82 is also fixed to barrel 77 adjacent the rear end of the latter, said lug having an inclined surface 82a formed at the forward and upper end thereof. A bore 83 in bolt 56 receives firing pin 77, 78, the

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latter extending centrally through cylindrical portion 57 of said bolt. Tip 79 (Fig. 11) is adapted in the extreme forward position of said pin to project beyond the end of said portion a sufficient distance to strike and ignite a cartridge held by said portion. A groove 85 is formed in the side wall of bore 83 to receive lug 82 and a slot 86 extends downwardly from said bore through the bottom wall of said block, sear-engaging member 80 being slidably mounted in said slot.

To operatively position firing pin 77, 78, a rod 87 (Figs. 7 and 10) extends into barrel 77 and has a head portion 88 which is fixed in bore 83 by a bayonet joint comprising a lug 89 on said head portion and a recess 90 in the wall of said bore. A coil spring 91 is held under compression between head 88 of said rod and pin 77, 78, being positioned around rod 87 and within barrel 77. Spring 91 normally urges pin 77, 78 in the direction of its firing position.

Novel means are provided for insuring that bolt 56 is locked against movement before firing can take place and that during movement of the bolt the firing pin does not project beyond the end of bolt portion 57. The means comprise a depending lug 92 formed on member 64 and a recess 93 in bolt 56 for said lug, said recess connecting with groove 85. When member 64 is in depressed position (Fig. 9), lug 92 engages inclined surface 82a of lug 82 and retracts firing pin 77, 78 relative to the bolt so that tip 79 is drawn within recess 83. When member 64 is in elevated position so that bolt 56 is locked, lug 92 is withdrawn from groove 85 and permits free movement of lug 82.

A novel unitary trigger mechanism is connected to receiver 26 and comprises a housing 94 (Figs. 6, 8, and 12) having a trigger guard 95 formed therewith and grip 30 fixed thereto by a screw 96. To cock the firing pin and control the release thereof, a sear 103 (Figs. 8 and 12) and a lever 104 (Figs. 8 and 15) are provided and are pivotally mounted on housing 94 by a pin 105 carried by bearing members 106 formed with said housing. A shoulder 107 on sear 103 and a shoulder 108 on lever 104 extend vertically in substantially the same lateral plane when said lever and sear are in elevated position (Figs. 12 and 15) and are adapted to engage shoulder 81 on member 80 as the bolt is returned from retracted position. As a result, firing pin 77, 78 is held while bolt 56 moves relative thereto into locked firing position and said firing pin is thus cocked against the resistance of spring 91 (Fig. 10). Sear 103 is normally held in elevated operative position by a spring 109 located in a recess 110 (Fig. 12) formed in housing 94 while lever 104 is similarly held by a spring 111 in a recess 112 (Fig. 15) in said housing.

Lever 104 is automatically depressed and disengaged from member 80 by novel means which comprise a cam or lug 113 on control link 68 (Figs. 6 and 7). Counterclockwise rotation of link 68 which occurs at the end of the travel of bolt 56 from retracted position causes lug 113 to engage lever 104 and to depress the latter when control link 68 has raised member 64 into engagement with the ends of shoulders 65. Thus, the firing pin cannot be released from cocked position until the bolt is locked in firing position.

Sear 103, if depressed after bolt 56 is locked, releases pin 77, 78, causing the latter to strike and ignite the cartridge, and novel means (Figs. 12 to 14), including a trigger 114, are provided for controlling the displacement of said sear. As

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shown, said means comprise a link 115 connecting said sear to said trigger and a cam 116 for said link, said cam being integral with a cylindrical member 116a rotatable through 180°. A pin 117 formed on said link is pivotally mounted in an opening 118 in said sear, and a spring 119 guided in a recess in said link bears against said sear and tends to hold said link in fixed position relative to said sear. A finger 121 carried by trigger 114 engages a shoulder 122 on said link. The latter is provided with an inclined surface 115a for engaging one end of cam 116 when said cam is in the position shown in Figs. 12 and 13. Pressure on the finger grip 114a of the trigger which is pivotally mounted in a manner more fully disclosed hereafter causes finger 121 to apply a downward force to shoulder 122, and imparts (as viewed in Fig. 13) a pivotal counterclockwise movement as well as a translatory downward movement to link 115. The translatory movement depresses sear 103 while the pivotal movement tends to free link 115 from finger 121 in such a manner that when sear 103 has released the firing pin, link 115 is disengaged from the trigger by the further movement of the trigger. This automatically returns sear 103 to operative position while trigger 114 remains pressed. The release of the trigger causes finger 121 to again operatively engage shoulder 122.

When cam 116 is rotated through 180° and assumes the position shown in Fig. 14, the end thereof engaged by side 115b of link 115 presents a flat bearing surface to the right of said link. This prevents movement of said link to the right and causes finger 121 to remain in continuous engagement with shoulder 122. Accordingly, in this position of the cam, when trigger 114 is pressed to depress sear 103, the latter remains disengaged from the firing pin until the trigger is again released. A set screw 123 (Fig. 16) is provided for fixing member 116 in a desired position, and a lever 124, operable by a small special tool, is located on the exterior of housing 94 and is connected to member 116a to provide a means for changing the angular position of cam 116.

Trigger 114 is pivotally mounted in a pair of recesses 125 in the side walls of housing 94 by a pair of pins 126 (Fig. 15) integrally formed with said trigger. A flat spring member 127 (Figs. 8, 12, and 15) is provided to operatively position trigger 114, said member having the base portion thereof dovetailed in a recess 128 in the upper wall of housing 94 and being provided with a pair of arms 129 and 130 extending on both sides of sear 103. Arm 129 is curved downward to engage the rear end of trigger 114 and acts as a cantilever spring to resiliently urge said trigger into inoperative position. Arm 130 has the end thereof held in a groove 132 in the side of housing 94 (Fig. 8).

A novel safety mechanism is provided and comprises a downwardly curved element 133 (Fig. 12) fixed to sear 103 and a laterally extending shaft 134, said shaft having a slot or groove 135 formed therein in the same lateral plane as said element. The angular position of shaft 134 is controlled by a lever 136 (Fig. 16) on the exterior of trigger housing 94 and when shaft 134 is turned so that groove 135 opens in the direction of element 133, sear 103 is free for depression by the trigger to release the firing pin. However, when shaft 134 is turned so that the ungrooved periphery thereof faces element 133, the latter is engaged by said shaft and the sear is positively locked against movement.

To hold bolt 56 in retracted position after the last cartridge from magazine 28 has been fired, a novel control member 137 (Figs. 6, 8, and 16) is provided and is mounted for limited pivotal movement on pin 105, said member, as shown, comprising a finger 137a and a rear bolt-engaging portion or arm 137b. A spring 138 normally holds arm 137b in raised position and said arm is adapted to slidably engage a groove 139 (Fig. 7) in bolt 56. Finger 137a extends forward through a recess 140 in the wall of receiver 26 (Fig. 6) and a slot (not shown) in magazine 28. When follower 62 has introduced the last cartridge into chamber 59, finger 137a is engaged thereby and tends to pivot arm 137b downward. Accordingly, when bolt 56 is retracted, said arm becomes free of groove 139 and moves downward to press against a lug 142 (Fig. 8) formed in the upper face of housing 94. As a result, the return movement of bolt 56 is prevented by the engagement of said arm with the forward end of the lower side wall of groove 139.

In order to fix member 116a in either of its extreme positions against inadvertent and accidental movement a pin 143 extends into a peripheral groove 144 in said member (Fig. 15), said groove subtending an angular distance equal approximately to the amplitude of movement desired for said member. Groove 144 is provided with a pair of radial recesses 145 for receiving said pin and determining the two positions of said member. A similar means for controlling shaft 134 of the safety mechanism in its movement into operative and inoperative positions is provided and, as shown comprises a peripheral groove 146, radial recesses 147 and a pin 148, said pin being guided by said groove from one recess to the other. Pins 143, 148 are resiliently held in operative position by means of a flat spring member 131 which is in turn held in housing 94 by arm 130 of spring 127.

To detachably secure housing 94 to receiver 26 a lug 97 (Fig. 6) on said housing is insertable into a recess 98 in said receiver and a novel locking mechanism is provided at the rear end of the receiver. The locking mechanism comprises a pair of laterally spaced grooves 99 (Figs. 3 and 5) and a cylindrical member 100 pivotably mounted in said receiver, member 100 having a pair of grooves 99a adapted to be in alignment with grooves 99 when said member is in inoperative position, as shown in Fig. 3. A pair of laterally spaced upwardly extending lugs 101 are formed on housing 94, and each of said lugs is adapted to fit into one of grooves 99, 99a. Lugs 101 are provided with substantially semicircular recesses 102 which are coaxial with member 100, when housing 94 is operatively positioned in the receiver. Accordingly when member 100 is rotated through approximately 180° the ungrooved periphery thereof engages the walls of recesses 102 and tightly locks housing 94 in operative position (Fig. 5). Rotary motion may be imparted to said member by means of an arm 100a attached thereto so as to be accessible from the exterior of the receiver (Fig. 3).

Novel means are provided for mounting the cartridge ejecting lug 63a and comprise a flat metallic strip 149 (Figs. 20 and 21) to which a cylindrical pin or shaft 150 is fixed, said pin having lug 63a formed therewith. Shaft 150 extends into receiver 26 through an opening 151 in the wall of said receiver and one end of strip 149 fits into a slot 152 while the other end is provided with a projection 153 which engages a recess 154

in said receiver. By raising the end of said strip from recess 154 and then pivoting the strip so that the other end is removed from slot 152, the strip, together with shaft 150 and lug 63a can be removed from the receiver.

A novel adjustable rear sight mechanism 155 is provided for cooperation with a stationary forward sight 156 (Fig. 1) and as shown, (Figs. 17, 18, and 19) said mechanism comprises a bracket 157 which may be secured to or formed integrally with receiver 26. A sight member 158 having a sighting recess 159 is adjustably mounted in said bracket. A pair of flanges 160 formed in the walls of said bracket extend inwardly and engage grooves 161 provided in the side edges of member 158. To vertically adjust member 158, a shaft 162 is provided and extends through the side wall of bracket 157, said shaft having a peripheral groove 163 formed therein for engagement with a lug 164 formed on member 158. The bottom wall of groove 163 serves to fix the vertical position of member 158, said wall having flat portions 163a, 163b and 163c which are spaced at different distances from the center of shaft 163 for engagement with lug 164. Rotation of shaft 162 determines which of said portions engages said lug and accordingly controls the adjustment of said member. To maintain lug 164 in groove 163 and in engagement with the bottom wall of said groove, a plate spring 165 is operatively held in a recess 166 in bracket 157 by a pin 167. Spring 165 is adapted to bear against lug 164 and also against a second lug 168 formed on member 158, said second lug being similar to lug 164 and laterally spaced therefrom. A depending skirt 169 on member 158 cooperates with an upwardly extending flange 170 on bracket 157 to prevent light from passing between said bracket and said member when the latter is in raised position. To disassemble the sight mechanism pin 167 is removed and this frees member 158, shaft 162 and spring 165 for removal.

In operation, the rifle is adapted for either semi-automatic firing, i. e., one shot being fired for each pull of the trigger, or for fully automatic firing, i. e., repeated firing, cam 116 constituting the selector for the type of firing. The cycles of operations in the receiver beginning with the ignition of a cartridge are substantially similar for both kinds of firing.

The gases of the ignited cartridge enter cylinder 32 and actuate piston 33 which, in turn, moves arm 40 rearward (Figs. 1 and 2). Lug 44 on said arm pivots control link 68 (Fig. 6) depressing locking member 64 on bolt 56 and disengaging said member from abutments 65 to free the bolt for rearward movement. Firing pin 77 and 78 is retracted within bolt 56 by the depression of member 64, lug 92 engaging and holding said pin in non-firing position. Further rearward movement of arm 40 is transmitted to bolt 56 by lug 45 which moves the bolt to the rear of receiver 26.

During retraction of the bolt, the spent cartridge shell is withdrawn from the barrel into cartridge chamber 59 and is ejected from said chamber through opening 63. The open cartridge chamber is filled with a fresh cartridge by magazine 28.

After retraction bolt 56 is moved forward by spring 39, rod 40 transmitting the motion to said bolt by means of lug 44. Portion 57 of said bolt engages the rim of the cartridge and forces the latter into firing position in the barrel and firing pin 77, 78 is cocked by lever 104 and sear 103, the latter members engaging member 80 of said

firing pin. When bolt 56 reaches the end of its forward travel, there is a further forward movement of rod 40 which pivots link 68 and elevates locking member 64, causing the latter to engage shoulders 65. As bolt 56 becomes locked, lever 104 is depressed by cam 113 and is disengaged from firing pin 77, 78. Lug 92 is also rendered inoperative. Thereafter, depression of sear 103 by trigger 114 releases firing pin 77, 78 and ignites the cartridge to repeat the above cycle.

It is to be noted that if sear 103 remains depressed as the bolt returns from retracted position, it does not engage the firing pin and the latter is held cocked only by lever 104. As a result, firing automatically takes place when bolt 56 becomes locked in firing position, lever 104 being then actuated, as above described, to release the firing pin.

For single shot firing, cam 116 is fixed so that sear 103 returns to elevated position immediately after release of the firing pin and while the trigger remains pressed. Thus, the trigger must be released to again become operatively connected to the sear and must be pulled after release for each shot that is fired.

For automatic or continuous firing, cam 116 is fixed so that sear 103 is continuously connected to trigger 114 and remains depressed as long as trigger 114 is pulled. The firing continues until the trigger is released or until the last cartridge in the magazine is fired.

The first loading of the cartridge chamber can be accomplished manually by retracting slide 43 when the latter is connected by pin 49 to arm 40. After the last cartridge is fired, follower 62 actuates member 137 and holds block 56 in retracted position until the magazine is removed.

There is thus provided a novel rifle adapted for automatic or semiautomatic firing comprising a reciprocating bolt mechanism, a firing mechanism movable relative to said bolt mechanism and adapted to be cocked in said bolt mechanism and actuating means responsive to the ignition of a cartridge for energizing said mechanisms. The firing mechanism is released for igniting a cartridge only when the bolt mechanism is locked in firing position and novel safety devices are provided for insuring that this result be attained. A trigger mechanism is detachably secured as a unit to the receiver and is provided with novel means for controlling the firing mechanism, a member of said trigger mechanism cooperating with the cartridge magazine to control the bolt mechanism after the last cartridge is fired from the magazine.

Although only a single embodiment of the invention has been illustrated and described, it is to be expressly understood that the same is not limited thereto. Various changes may be made in the design and arrangement of parts without departing from the spirit and scope of the invention, as will now be apparent to those skilled in the art. For a definition of the invention, refer-

ence will be had primarily to the appended claims.

What is claimed is:

1. In a rifle having a cartridge chamber, a magazine and a receiver, a bolt mechanism mounted in said receiver, a locking member pivotally mounted on said bolt mechanism, a firing mechanism carried by said bolt mechanism, means including a reciprocatory rod and a link pivotally connected with said rod and pivotally mounted on said locking member for actuating said bolt mechanism to reload the cartridge chamber, a cam on said bolt and engaged by said link for effecting movement of said locking member to lock said bolt mechanism in firing position, means carried by said receiver for cocking said firing mechanism during movement of said bolt mechanism to firing position, and cam means on said link for releasing said cocking means when said locking member is moved into locked position.

2. In a rifle having a receiver, an abutment in said receiver, a bolt slidably mounted in said receiver, and a spring pressed firing pin carried by said bolt, the combination therewith of means for cocking said firing pin when said bolt is in firing position, a locking member pivotally mounted on said bolt for movement into engagement with said abutment to hold said bolt in firing position, a lug on said member arranged to engage and prevent movement of said firing pin to firing position when said member is moved out of engagement with said abutment, means for reciprocating said bolt, said means including a reciprocatory rod and a link pivotally connected with said rod and pivotally mounted on said member arranged to move the latter out of engagement with said abutment at the beginning of each reciprocation and into engagement with said abutment at the completion of each reciprocation, cam means on said bolt for controlling the movements of said locking member by said link, and cam means on said link for moving said cocking means to inoperative position when the said member is moved by said link into engagement with said abutment.

3. In a rifle adapted for repeated firing and having a receiver, a bolt mechanism including a spring-pressed firing mechanism mounted in said receiver, means for actuating said bolt mechanism, said actuating means comprising a reciprocatory rod, a locking member movably mounted on said bolt mechanism and a link pivotally connected with said rod and pivotally mounted on said locking member and arranged to move the latter into operative position when said bolt mechanism is in firing position, means mounted for pivotal movement on said receiver for cocking said firing mechanism during movement of said bolt mechanism to firing position, and means on said link for releasing said cocking means when said locking means is moved into operating position.

GEORGE J. HYDE.