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TRIGGER SAFETY FOR BOLT ACTION RIFLE

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9 Claims. (Cl. 42—70)

The present invention relates to improvements in small arms, such as rifles or the like, and in certain aspects finds particular utility in bolt action rifles.

This is a divisional application of applicant's copending application Serial No. 775,143, filed November 20, 1958, now Patent No. 3,005,279, and assigned to Savage Arms Corporation.

The principal object of this invention is to provide improved safety mechanism for firearms, such as bolt action rifles and the like.

These and related objects of the invention including the novel features by which such ends are obtained will be apparent from the following description of the disclosure found in the accompanying drawings and the particular novelty thereof pointed out in the appended claims.

In the drawings:

FIG. 1 is a side elevation of a receiver and associated parts embodying the present invention with certain portions thereof broken away and with the action closed;

FIG. 2 is a plan view of the elements seen in FIG. 1 with the action open;

FIG. 3 is a fragmentary section taken on line III—III of FIG. 1, with the bolt removed from the receiver and with the shells removed from the magazine;

FIG. 4 is an exploded perspective view, on an enlarged scale, of the magazine and ejector assembly seen in FIG. 1;

FIG. 5 is a partially exploded perspective view on an enlarged scale and with portions in section, of the bolt seen in FIG. 1;

FIG. 6 is a section taken on line VI—VI in FIG. 5;

FIG. 7 is a perspective view on a different angle showing the front end of the bolt seen in FIG. 5 and illustrating its relation to the receiver which is shown partially in section and with its extractor in exploded relation;

FIG. 8 is a perspective view, with certain parts removed, showing a different angle of the rear end of the bolt seen in FIG. 5;

FIG. 9 is a longitudinal section showing the front end of the bolt as it would be locked up in the breech preparatory to firing the illustrated cartridge;

FIG. 10 is a plan view of certain component parts seen in FIG. 5;

FIG. 11 is a section taken on line XI—XI in FIG. 5;

FIG. 12 is an elevation on an enlarged scale and with certain portions being shown in longitudinal section, of the firing mechanism indicated in FIG. 1;

FIG. 13 is a section taken on line XIII—XIII in FIG. 12;

FIG. 14 is a perspective view of the mechanism seen in FIG. 12 detached from the receiver;

FIG. 15 is a perspective view on a different angle of the mechanism shown in FIG. 12 showing an operative relationship with the bolt; and

FIG. 16 is a section taken on line XVI—XVI in FIG. 12 showing only the receiver and its tang.

The present invention includes certain aspects which are related to bolt action rifles as well as other novel features having broader utility in the field of small arms as will be apparent to those skilled in the art. FIGS. 1 and 2 illustrate the relationship of the various components of a bolt action rifle embodying these inventive features.

Thus a rifle stock 20 is grooved to receive the lower portion of a receiver 22 and secured thereto by screws 24, 26 threaded into the receiver. The rifle barrel briefly indicated at 28 is threaded onto the forward end of the receiver with a lock nut 30 clamping a recoil plate 32 against the front face of the receiver 22. The recoil plate 32 may be received in a transverse slot formed in the rifle stock 20 so that, if desired, the barrel 28 may be otherwise dissociated from the rifle stock to give a free floating barrel mounting yielding greater accuracy.

A bolt 34 is slidably and rotatably mounted in the receiver 22 and may be operated by a handle 36 to carry out the functions normally associated with bolt action rifles. Thus the handle 36 may be raised from the position seen in FIG. 1 to rotate the bolt 34, and cock the firing pin. It may then be retracted (FIG. 2) to withdraw an expended cartridge shell from the firing chamber to automatically eject the shell and then moved forwardly to feed a fresh cartridge from a magazine 38 into the chamber. When the handle 36 is again moved to its lower position, the bolt is locked in the breech of the rifle with the firing pin cocked in position to be released by the trigger 40. The above brief description is provided primarily to give an over-all picture of the rifle in which the present invention is embodied and the various components thereof, as well as its detailed mode of operation, will now be described in detail.

The bolt 34 best seen in FIGS. 5 through 10, and particularly in FIG. 5, comprises an elongated tubular body 42. The bolt handle 36 is provided with a hub 44 (FIGS. 5 and 8) having an inturned flange 45 which seats on the rear end of the tubular body 42. The hub 44 is slotted at 46 to receive diametrically opposed projections 48 extending from the rear end of the tubular body 42, thereby angularly positioning the handle 36 with respect to the tubular body 42. A screw 50 is threaded into the rear end of the tubular body 42 to secure the handle 36 in place. Ball detents 51 (FIG. 10) engage grooves 53 in the hub 44 (FIG. 8) to prevent loosening of the screw 50 when the rifle is in use and yet permit easy manual disembly of the screw 50 without the need for special hand tools.

A bolt head 52 is disposed at the front end of the tubular body 42 and has a reduced diameter 54 (FIGS. 5 and 6) telescopically received within the front end of the tubular body 42. The bolt head 52 is angularly positioned by a projection 56 struck from the upper surface of the body 42 (FIG. 6) and received by a notch formed on the inner end of the reduced diameter 54. A locking pin or cross pin 58 secures the bolt head in place on the front end of the body 42. It will be seen that oppositely extending lock lugs 60 project from the fore portion of the bolt head 52. A front baffle 62 is rotatably mounted on the reduced diameter 54 between the front end of the body 42 and the lock lugs 60 and further has oppositely extending baffle lugs 64 projecting therefrom, the baffle lugs 64 having the same general cross section as the lock lugs 60. It will also be noted that a spring friction washer 66 (FIG. 9) is disposed between the front baffle 62 and the bolt head 52 to urge the latter forwardly and thereby maintain the pin 58 in place and also to prevent the free relative rotation between the lugs 64 and the lugs 60, that is, the lugs 64 will be held from turning out of line with lugs 60 by themselves when outside the receiver.

The bolt 34, as thus far described, is slidingly received within a bore 68 (FIG. 3) extending lengthwise of the receiver 22, while horizontally disposed channels 70, opening outwardly of the bore 68, slidingly receive the lugs 64 and 66. The channels 70 terminate (FIG. 7) at the forwardmost position of the lock lugs 60 and the front end of the receiver is counterbored to form locking shoul-

ders 72 (FIG. 7) which are angularly disposed to the channels 70. With this arrangement the bolt 34 is locked in the breech by moving the bolt to its forwardmost position and then rotating the handle 36 from upper position to its lower position and thus bringing the lock lugs 60 into engagement with the shoulders 72, thereby locking the bolt. It will also be noted that when the bolt is so rotated the baffle lugs 64 are captured in the channels 70 and their position relative to the receiver remains unchanged. This relationship of lugs 60 and 64 also involves the baffling of gases as in the event of a ruptured cartridge, all as will be later dealt with in greater detail.

After firing a shell, the bolt handle is raised to return the locking lugs 60 into alignment with channels 70 preparatory to retracting the bolt and extracting the expended cartridge casing from the firing chamber. The relationship of the bolt head to the cartridge casing is best appreciated from FIG. 9 wherein it will be seen that the forward end face of the bolt head is counterbored at 73 to receive the grooved end of the cartridge case *c*. An extractor 74 is mounted on the forward end of the bolt head 52 and includes a lip or hook 76 (see also FIG. 7) which engages the conventional groove formed in the grooved end of the casing *c*. More particularly, the extractor comprises a split spring band or clip having a relatively thin annular section 78 (FIG. 7) with grooved retaining lugs 80 at either extremity, the hook 76 extending from one of the retaining lugs 80. The forward end of the bolt head is relieved at 81 (FIG. 7) to receive the annular extractor section 78 with grooves 82 (FIGS. 7 and 9) being provided to receive the rear portions of the retaining lugs 80, thereby positively positioning the extractor 74 relative to the bolt head 52 in an axial sense. This mounting arrangement further permits the spring band to be expanded as the retaining lugs 80 are snapped into notches 83 in the front face of the bolt head 52 with the lip or hook 76 projecting into the counterbore 73. The extractor 74 thus yieldingly hooks the rear end of a cartridge casing and is free to be deflected when the end of a cartridge case is inserted or ejected from the counterbore 73. It will be appreciated that the extractor is simple to manufacture, requires a very minimum of space and may be easily removed simply by springing one or the other of the retaining lugs 80 out of the notch or recess 83 formed in the end of the bolt head.

The extractor 74 thus releasably grips the cartridge by the hook 76 and after firing, the bolt handle is rotated to its upper position preparatory to withdrawing and ejecting the casing. On firing the cartridge the casing will expand in the chamber and cam means are provided for positively camming the bolt rearwardly to initially free the casing from the chamber. These means comprise a member 84 rotatably and slidably mounted on the bolt body 42 between the bolt handle hub 44 and the rear end of the receiver 22 (FIGS. 1 and 8). Member 84 also serves as a rear gas baffle, as is later explained, and further includes a cam face 86 which is engaged by a projection 88 extending from the handle hub 44. In the last part of the upward movement of the bolt handle 36 the projection 88 engages the cam surface 86 and positively displaces the bolt 34 rearwardly thereby drawing with it the expended cartridge casing which is gripped by the lip or hook 76. It will be noted the extractor 74 is in the counterbore end of the barrel at this point and is thereby prevented from expanding as the casing is forcibly removed by this camming action. The bolt may then be fully retracted and the shell casing carried rearwardly to the ejector mechanism for automatically kicking the expended shell casing from the receiver.

Reverting back to member 84, it will be seen that it is somewhat greater than semi-circular in cross section with its lower ends resting upon shoulders 90 (FIG. 1) formed adjacent the rear end of the receiver 22. The member 84 is normally maintained in a given angular relationship with the bolt body 42 by means of a spring pressed ball

detent 92 (FIG. 5) riding in a longitudinal groove 94 formed in the tubular body 42. This detent arrangement permits the bolt body to be rotated relative to the member 84 when the bolt handle 36 is moved to its lower position to lock the bolt in the breech of the rifle.

Referring next to FIG. 6, it will be seen that a tapered slot 96 is cut in the lower front end of the bolt head 52 and enters the bottom of the counterbore 73. Upon retraction of the bolt 34, the slot 96 is in aligned relation with a stamped sheet metal ejector 98 (FIGS. 1 and 3) which is spring urged upwardly. As the bolt nears full retraction, the ejector 98 enters slot or groove 96 and the rear end of the casing will forcibly strike the forward face of the ejector 98, thereby kicking the casing out through an ejection port or cut-a-way 100 intermediate the ends of the receiver. It will be noted that the lip 76 (FIG. 7) is generally aligned with the port 100 so that as the rear end of the casing strikes the ejector 98 it will be thrown laterally through the port 100 in a low arc.

The ejector 98 is disposed towards the rear of a bottom or lower opening 102 formed in the receiver 22 and is provided with an integral depending tail 104 which is guidingly received by a slot 106 formed in an ejector housing 108 (see also FIG. 4). The upper end of the ejector 98 slidingly engages the rear wall of a magazine box 110 and the rear wall of the receiver opening 102. A spring 112 is captured between the bottom wall of housing 108 and a projection 114 extending rearwardly of the extractor 98. This arrangement provides for vertical reciprocating movement of the ejector 98 allowing it to move upwardly into the slot 96 of the bolt head 52 upon retraction of the bolt and to thereby eject the expended casing. The extractor is thereafter cammed downwardly as the bolt is again moved forwardly to feed another shell from magazine 38 into the firing chamber.

Referring now to the magazine 38 it will be seen that it comprises the magazine box 110 which is a sheet metal stamping bent into a rectangular configuration with the ends of the stamping meeting in abutting relation along a vertical line intermediate the width of the rear wall of the magazine box as is best seen in FIG. 4. A pair of tabs or lips 116 project outwardly from the rear wall of the magazine box and receive a downbent tab 118 extending from the ejector housing 108. The rear wall of the magazine box is also slotted at 120 to receive projections 122 extending from the walls of housing 108 to prevent the rear wall of the magazine 110 from spreading. It will also be noted that a lip 124 projects forwardly from the front wall of box 110 and lips 126 project rearwardly from the rear wall of the box. The lips 126 are spaced apart to permit passage of the ejector 98 therebetween and further guide said ejector. The lips 124, 126 are both spaced below the upper side edges 128 of said box, so that box 110 may preferably be mounted on receiver 22 by forming ledges 130 (FIGS. 1 and 3) longitudinally of the bottom opening 102 and opposed horizontal slots 132, 134 spaced downwardly from the ledges 130 at the forward and rear ends of the opening 102. With this arrangement, the magazine box 110 may be assembled on the receiver 22 by inserting the lips 126 fully into the slot 134 engaging the upper box edges 128 with the ledges 130 and then shifting the box forwardly a distance sufficient to introduce the lip 124 into the slot 132 and against the forward end of the receiver opening 102. The housing 108 with the ejector 98 and spring 112 assembled thereon is then inserted between the rear end of the box 110 and the forward end of the bottom opening 102 with the projections 122 entering the slots 120. Thus lips 124 and 126 are caught in the slots 132 and 134 respectively and cannot be removed without dismantling the housing 108.

It will be appreciated that while the combination mounting of the ejector 98, its housing 108 and the magazine box 110 have certain unique cooperative relationships, it would be possible to attain advantages by mounting either one or the other in the manner described, utilizing the

necessary functions attributable to each and yet by either using some other form of ejector mechanism or using some other means for mounting the magazine box.

As can be seen from FIG. 1 the magazine box 110 is disposed within a central opening through the rifle stock 20. A base plate 131 covers over the bottom of this opening and is held in place by the screws 24, 26. A follower plate 133 is urged upwardly from the base plate 131 by a spring 135. This arrangement, as illustrated, permits cartridges to be loaded through the upper and lower ports 100 and 102 into the magazine 38 in staggered relationship. The follower plate 133 is provided with an off-set projection 137 (FIG. 2) which insures that the cartridges will be caught on one side or the other of the bottom opening 102 (see FIG. 3) and not be fed loosely from the magazine 38. The cartridges project upwardly a sufficient distance so that upon full retraction of the bolt 34 the rear end of the uppermost cartridge is picked up for projection by the bolt 34 centrally from the magazine and then carried into the firing chamber as the bolt is moved forward. It will be seen that the inbent ridges 139 are formed on the side walls of the magazine box 110 to engage the forward shoulders of the cartridge casings to prevent shucking of the cartridges and consequent damage to the tips of the bullets.

The firing mechanism for the present invention is uniquely simple and comprises a firing pin 136 (FIG. 5) centrally disposed within the tubular bolt body 32 and projecting through a central bore of the bolt head 52. A firing pin stop nut or stop piece 138 is threaded on the forward end of the firing pin 136 and is engageable with the rear end of the reduced bolt head diameter 54 to limit the protrusion of the forward end or point 141 of the firing pin 136 beyond the counterbore 73. The point 141 of the firing pin 136 is best seen in its cocked position in FIG. 9, wherein it can also be seen that the bore in the outermost end of the bolt head closely approximates the diameter of the point of the firing pin to minimize the amount of gas which may be blown rearwardly through the bolt body 42. As has been noted, the stop piece 138 controls the extent of firing pin protrusion, this being established by threading the stop piece 138 to the appropriate axial position on the firing pin 136.

A lock washer 140 (FIG. 5) maintains the stop piece 138 in adjusted position. More particularly, the lock washer 140 is formed with a central opening having a straight edge which non-rotatably engages a flat 142 formed lengthwise of the firing pin 136 and has spurs projecting outwardly and received in notches formed in the rear end of the stop piece 138.

A main spring 144 is coiled about an intermediate length of the firing pin 136 and is seated at its forward end on the lock washer 140 and at its other end on a washer 146 which is axially positioned on the firing pin 136 by a cocking piece 148 threaded on the rear end thereof to preload the spring 144. The washer 146 is also non-rotatably mounted on the firing pin 136 by reason of a central hole having a straight edge (FIG. 11) engaging the flat 142. A sleeve 150 slidably surrounds the cocking piece 148 (FIG. 5) and is provided with projections 152 (FIG. 11) at its forward end which interdigitate with spurs extending outwardly of the washer 146. The sleeve 150 (FIG. 10) at its rear end butts against a shoulder formed on the assembly screw 50 and is rotatably mounted thereon by means of indentations as at 154 which engage a peripheral groove 156 formed in the forward end of the screw 50. The sleeve 150 is provided with a lengthwise slot 158 having a width somewhat less than the diameter of a transverse hole 160 formed adjacent the rear end of the cocking piece 148. A cocking pin 162 (FIG. 8) is disposed within the hole 160 (FIG. 5) and retained therein by the marginal edges of the sleeve slot 158 embracing a necked portion adjacent the head of the pin 162. The head of cocking pin 162 is disposed adjacent the outer surface of the bolt body 42 passing through a cam opening 164 formed therein.

With this arrangement of parts, the firing pin may be cocked and fired in the following fashion. From FIG. 12 it will be seen that the head of the cocking pin 162, in the forward position of the bolt is disposed within the rear of receiver 22, entering into the near channel 70. A sear lever 166 projects upwardly into the near channel 70 (see also FIG. 13) in obstructive relation to further forward movement of the cocking pin 162, and is integrally formed on a sear 169 to be later described in detail.

Normally the firing pin 141 is held in a retracted or cocked position by reason of spring 144 being compressed and held by the cocking pin resting in a notch 168 (FIG. 5) formed adjacent the rear end of the cam opening 164. In this position of the cocking pin 162 the cocking piece 148 and striker 136 are of course retracted while the spring 146 is compressed since the washer 146 is held relatively stationary by the sleeve 150. The above describes the relative disposition of the cocking pin 162 and related parts as the bolt 34 is moved forwardly to close the action of the rifle. After the action is closed, the bolt handle 36 is lowered to locked position as above described. In so lowering the handle 36, the bolt body 42 is rotated relative to the receiver 22 while the cocking pin remains relatively stationary being captured in the channel 70. The cocking pin 162 is thus held in cocked position at the rear of the greatest lengthwise extent of the opening 164 and the rifle is in readiness to be fired. Finger pressure on the trigger 49 will release the sear 169, in a manner later described, allowing the sear lever to swing downwardly out of the path of forward movement of the cocking pin 162 thereby permitting the firing pin to percussively strike the cartridge in the firing chamber under the influence of main spring 144. It will be noted that the cocking piece 148 is axially adjusted on the firing pin 136 to prevent the cocking pin 162 from striking the forward end of the opening 165.

After the rifle has thus been fired the bolt handle 36 is raised to its upper position thereby rotating the tubular bolt body 42 relative to the cocking pin 162. During this rotation the angularly confined pin 162 is displaced rearwardly by cam surface 171 (FIG. 5) of the opening 164 thereby camming the cocking pin 162 and with it the firing pin 136 rearwardly and reseating the cocking pin 162 in the notch 168. Spring means, later described, return the sear lever 166 to the position illustrated in FIG. 12 and the firing cycle just described may be repeated after retraction of the bolt 34 to eject an expended cartridge casing and return movement of the bolt to feed a fresh cartridge into the chamber.

The bolt and firing pin assembly above described comprise parts which may be readily fabricated primarily by screw machine operations and by sheet metal stampings. Their assembly in the original manufacture of the rifle as well as their disassembly for repair or adjustment is extremely simple and convenient. Disassembly involves merely the removal of screw 50 together with sleeve 150, removal of cocking pin 162, withdrawal of the firing pin 136 and removal of the pin 58 to take down the component parts of bolt 34. The main spring 144 may be removed by threading the cocking piece 148 off the rear end of firing pin 136. Adjustment of the extent of protrusion of the point 141 of the firing pin, may be made by telescoping the bolt head 52 over the point 141 in abutting relation with the stop piece 138. With lockwasher 140 removed, stop piece 138 may be varied axially of firing pin 136 to obtain the desired extension of point 141 beyond the inner face of counterbore 73. The extent of protrusion may be gauged by the sleeve 150 (FIG. 10). With the extractor 74 removed the sleeve projections 152 may be brought against the counterbore 73 on either side of the firing pin 141 and the amount of protrusion set to match the height of the projections 152

which height is in fact the preferred distance for protrusion of the firing pin.

Normally when a cartridge is discharged its casing is expanded into sealing contact with the walls of the firing chamber preventing rearward escape of gases so that at least substantially all of the gases are propelled outwardly through the barrel of the rifle. However, in the case of an ineffective seal or rupturing of the cartridge casing, gases may blow back rearwardly of the firing chamber past the bolt head 52 which is locked in the breech of the firing chamber. In order that gases may not injure the user of the rifle, various ports and baffles are provided to deflect such gases laterally of the receiver. In FIG. 7, the tapered slot 96, when the bolt head is locked, is disposed to provide communication for the forward end of the bolt head 52 with a lateral hole 151 formed in the receiver 22 forward of the channel 70 (FIG. 2). The slot 96 thus provides conduit means for conducting gases from the rifle chamber to a predetermined location in the receiver. It will be noted that the baffle lug 64 is aligned with the slot 96 and the port 151 for deflecting gases outwardly through the port 151. This will effectively minimize the passage of gases rearwardly of the front baffle. What little gas may pass between the bolt and receiver is throttled as it enters the opening 100 thereby safely dissipating its effect.

There may also be a possibility of gases passing through the firing pin hole opening of the counterbore 73 (FIG. 9). Such gases would pass interiorly of the bolt head and then be vented for the most part through a port 153 (FIG. 7) communicating with the interior of said bolt and aligned with a port 155 (FIG. 2) formed in the receiver 22. The firing pin hole and port 153 provide conduit means for conducting gases from the rifle chamber to a predetermined location in the receiver. The baffle lug 64 is aligned with the ports 153 and 155 for deflecting gases outwardly of the receiver through the port 155. This effectively minimizes the passage of gases rearwardly of the baffle. There is also a possibility that some gases will pass rearwardly through the bolt body 42 and escape through the cam opening 164 which in the firing position of the bolt is enclosed within the rear end of the receiver 22. In order to prevent gases from escaping from the rear of the receiver 22 adjacent the eye of the shooter, member 84 is arranged to serve as a baffle member and is positioned at the rear end of the receiver to insure lateral deflection of such gases. This position of the member 84 is automatically provided for by the manner in which it is mounted on the bolt body 42. As has been noted, the member 84 is rotatable on the body 42 and as can be seen, is also axially slidable thereon. Thus, in the primary ejection of an expended cartridge the member 84 will be firmly seated against the rear face of receiver 22 when projection 88 (FIG. 8) engages cam surface 86 as previously described. This position of member 84 is also assumed when the action is locked, as indicated in FIG. 1.

The rear baffle is free to slide forwardly and rearwardly slightly so that pressure of escaping gas will move it backward if necessary to escape.

The sear 169 and trigger 40 also embody certain novel features which will be apparent from the following detailed description of their construction and operation with particular reference being had to FIGS. 12–16.

A U-shaped trigger mounting bracket 172 is secured beneath a tang 174 extending rearwardly of the receiver 22. More particularly the bracket 172 comprises a sheet metal stamping having its bridge vertically disposed towards the rear of tang 174. A tab 180 is bent rearwardly from the upper edge of the bridge of bracket 172 and is received in an appropriate recess 177 (FIGS. 12 and 16) formed adjacent the rear end of a slot 176 extending through the rear portion of tang 174. Recesses 181, 183 (FIG. 13) are formed on opposite sides of the lower surface of the receiver 22 and provide vertical faces which are embraced by ears 182 extending upwardly from the front

ends of the arms of bracket 172. A pin 184 extends through the ears 182 and the embraced portion of receiver 22 to secure the front end of bracket 172 thereto with its upper edges engaging the lower surface of tang 174 and its rear end retained in place by tab 180. The pin 184 is thus the single fastening element for the trigger mounting bracket 172.

The trigger 40 is pivotally mounted on a pin 186 extending between depending ears 187 (FIGS. 12 and 15) of the bracket 172. The trigger 40 comprises, as can be seen, a rearwardly extending leg 188 which is cooperatively disposed relative to a safety member 190, later described in detail, and a forwardly extending leg 192 which is disposed in cooperative relationship with the sear 169.

The sear 169 is bent from a single piece of sheet metal and comprises two U-shaped portions one of which includes a bridge 196 (FIGS. 14 and 15) and arms 194, 195 embracing the bracket ears 182 (FIG. 13) and pivotally mounted on the pin 184. The second U-shaped portion comprises a second bridge 197 interconnecting the arm 195 with a third outwardly spaced arm 199.

The sear lever 166 is formed as an integral extension of the sear arm 195 and projects through slot 201 into channel 70 (FIGS. 13 and 16) to cooperate with the cocking pin 162 as above described. The sear arm 199 extends upwardly receiving the unbeaded end of pin 184, and extending above the stock 20 (FIG. 13) adjacent a relieved portion 203 of the receiver 22. The upper end of arm 199 is outbent to provide a visual indicator 205 which may readily be checked when the action is closed to determine whether or nor the firing pin is cocked. That is, when the firing pin is cocked the indicator 205 is in its upper position seen in FIG. 12, and after the gun has been fired, forward movement of the cocking pin 162 depresses the sear lever 166 into slot 201 and rotates the sear 169 bringing the indicator 205 to a lower horizontal position.

A torsion spring 206 (FIGS. 12 and 13) is disposed between the sear arms 195, 199, being concentrically positioned on the pin 184 by a bushing 208. The free ends of the torsion spring 206 respectively bear against the rear surface of receiver recess 183 and the upper end of the bridge 197 to urge the sear 169 in a counterclockwise direction (FIG. 12) and thus return the cocking lever 166 to its upright position when the firing pin is cocked by manipulation of the bolt handle 36 as above described.

The sear 169 is latched in what may be termed its cocked position by the lower knife edge of the bridge 196 bearing against the forward face of the trigger leg 192. It will be seen that a spring loaded plunger 210 (FIG. 12) bears against the trigger leg 188 to urge the trigger leg 192 into obstructive relation with the sear bridge 196. When the action is closed and the bolt locked in the receiver, the head of cocking pin 162 will engage the sear lever 166 and under the influence of main spring 144 tend to rotate the sear in a clockwise direction (FIG. 12) bringing the knife edge of bridge 196 into firm engagement with the forward face of trigger leg 192. The extent of this engagement is adjustably controlled by a screw 212 threaded into the outer end of leg 192. It will be apparent that if the screw 212 were threaded further inwardly of the leg 192 the bridge 196 would be disposed nearer the upper edge of the leg 192 and conversely if the screw 212 were threaded outwardly the spring loaded plunger 210 would rotate the trigger to space the knife edge of bridge 196 further from the upper edge of the leg 192. In this manner the extent of trigger travel necessary to release the cocking pin 162 may be controlled to suit the needs of the user of the gun.

The spring loaded plunger 210 is mounted on the safety member 190 which is longitudinally slidable between the arms of the trigger bracket 172.

The safety member 190 is provided with a thumb piece 220 which is integrally formed as a rearward extension of an upward projection from the safety member 190 and

projecting upwardly through the tank slot 176. The thumb piece 220 (FIG. 12) slidably engages the upper surface of tang 174 to provide the rear bearing point for the safety member 190. A pin 222 extends between the arms of bracket 172 and slidingly supports a forward horizontal undersurface of the safety member 190. An adjustable intermediate bearing point for the safety member is provided by an upwardly projecting screw 224 which is threaded into the safety member 190 and bears against the lower surface of tank 174.

Various surfaces formed on the trigger leg 188 cooperate with the safety member 190 as will now be described. A raised land 226 is formed at the rear of leg 188 beneath a screw 228 projecting from the safety member 190. When the safety member is in the "safe" position illustrated in FIG. 12, the screw 228 is in obstructive relation with land 226 thereby preventing any rotation of the trigger 40 sufficient to bring the leg 192 out of obstructive relation with the sear bridge 196, which in turn prevents release of the cocking pin 162 and discharge of the piece. The safety member is also arranged to lock the bolt 34 so that the action cannot be inadvertently opened when the gun is in "safe" condition. This is attained by an upstanding lug 230 projecting from the forward end of the safety member 190 through a second tank slot 232 (FIGS. 12 and 16) spaced forwardly of the slot 176. The bolt handle hub 44 is notched at 234 (FIG. 15) to receive the lug 230 when the bolt handle 36 is in its lower position thereby locking the bolt 34 with the action closed.

The trigger leg 188 is transversely notched at 229 to receive the spring loaded plunger 210 to provide detent means for releasingly maintaining the safety member 190 in its "safe" position.

The safety member 190 is displaced forwardly of the notch 229 to a further "safe" position in which the screw 228 will still be disposed above the land 226 preventing releasing movement of the trigger 40 and wherein the lug 230 will be disposed forwardly of the bolt handle hub 44. In this position of the safety member 190 the action may be opened and closed by manipulation of the bolt handle 36, as, for example, to discharge an expended cartridge casing, or to empty the magazine 38 by reciprocation of bolt 34 without danger of firing the rifle.

In the forwardmost or firing position of the safety member the screw 228 is spaced forwardly of the raised land 226 allowing sufficient movement of the trigger 40 to release the sear 169, thereby releasing the firing pin. A second transverse notch 231 is formed in the trigger leg 188 to receive the spring loaded plunger 210 and releasably maintain the safety member 190 in its firing or inoperative position. Travel of the trigger beyond that necessary to bring the leg 192 out of obstructive relationship with the sear bridge 196 may be limited by a screw 236 threaded into the same hole as the screw 224 and projecting from the lower surface of safety member 190. Thus, immediately upon release of the sear 169 the trigger leg 188 may be arranged to engage the screw 236 thereby minimizing the extent of trigger travel after firing the rifle. The force of trigger pull is primarily controlled by a spring 216, confined by a screw 218, and (FIG. 12) urging the plunger 210 into engagement with the trigger leg 188. The force of spring 216 may be varied by the extent to which screw 218 is threaded into the safety 190. With the safety member 190 in the illustrated safe position, it will be seen that the upper end of screw 218 is accessible through slot 176 to receive a screw driver whereby the force of spring 216 may be readily adjusted without disassembly of the rifle components.

A further point to be noted is that the sear lever 166 also serves as a bolt stop. That is, when the bolt is retracted, the right hand (FIGS. 5 and 13) baffle lug 64 will engage the sear lever 166 thereby limiting rearward travel of the bolt 34. When it is desired to remove the bolt, trigger 40 is pulled to drop the trigger leg 192 below sear bridge 196 and then cocking indicator 205 is depressed (see also FIG. 12) to lower cocking lever 166 below the level of channel 70 thereby permitting the bolt 34 to be withdrawn from the receiver 22.

Operation

The rifle is loaded by inserting cartridges downwardly into the magazine while the bolt 34 is disposed in its retracted position. A cartridge is rammed into the firing chamber of the rifle by forward movement of the bolt, lip 76 of the extractor 74 engaging the groove of the cartridge case. As the bolt 34 is moved forwardly in the receiver the cocking pin 162 engages the sear lever 166 (FIG. 12). When the bolt is rotated to its breech closing position, the cocking pin is prevented from rotating by channel 70 of the receiver and is held in its cocked position at the rear of the bolt cam opening 164 (FIGS. 5 and 8) by the sear lever 166. The cocking indicator 205 (FIG. 12) is disposed in its upwardly extending position indicating the cocked condition of the rifle. When the bolt is rotated to its locked position, the lock lugs 60 are carried into engagement with the shoulders 72 in the breech end of the receiver thus locking the bolt in its closed position. The baffle lugs 64 are prevented from rotating by channel 70 and are held thereby in axial alignment rearwardly of the receiver gas escape ports 151 and 155 (FIG. 2) and the slot 96 and port 153 (FIG. 7) on opposite sides of the bolt 34.

The cocking pin 162 is held in its cocked position against the force of the compressed main spring 144 by the sear 169 which is prevented from rotating by the trigger leg 192. As shown in FIG. 12, the plunger 210 urges the trigger leg into its sear engaging position. When the trigger is pulled, the plunger 210 is forced upwardly against spring 216 and the trigger leg 192 is pivoted downwardly releasing the cocking pin 162. The firing pin is thrust forwardly by the main spring 144 firing the round in the chamber and the cocking pin 162 moves the sear lever 166 downwardly out of the channel 70.

In the event of rupture of a cartridge case, escaping gases are deflected outwardly through the gas escape ports by means of the baffle lugs 64. Furthermore, any gas which might escape rearwardly of the baffle lugs will be deflected outwardly by the rear baffle 84.

To discharge the cartridge case after a round is fired, the bolt handle 36 is rotated counterclockwise. Projection 88 (FIG. 8) of the bolt handle engages the cam face 86 of the rear baffle and the bolt is cammed rearwardly to break the seal of the cartridge case in the chamber.

As the bolt handle 36 is raised, the cocking pin 162 is prevented from rotating by channel 70 (FIG. 12) and is displaced rearwardly by the cam surface 171 (FIG. 5) of the opening 164. The cocking pin 162 is thus reseated in the notch 168, its position prior to loading the round into the chamber. The sear spring 206 returns the sear 169 to the position illustrated in FIG. 12.

As the bolt is pulled rearwardly to eject the cartridge case, the ejector 98 is received in the slot 96 (FIG. 6) of the bolt and the ejector strikes the lower edge of the cartridge case which is then ejected from the receiver. Another round may then be loaded into the chamber and the firing cycle repeated.

It will be noted from the disclosure as seen in the drawings that the rifle is for a right handed shooter. Very few parts of the assembly would require changes in order to convert the same for left handed shooting. The bolt body, handle, and head, the extractor, the receiver port, the rear baffle, and the stock are the only parts requiring conversion to manufacture guns for the left hand shooter. The remaining mechanism need not be altered and accordingly most of the component parts can be interchangeably used for right hand or left hand rifles.

Having thus described the invention what is novel and desired to be secured by Letters Patent of the United States is:

1. In a rifle or the like, a receiver having a lengthwise bore, a bolt slidable therein, a sear for holding the firing mechanism of said bolt in cocked position in the normal position of said sear, said receiver having opposed recesses formed in its lower portion generally beneath the rear end thereof, said recesses including opposed vertical faces, said receiver further comprising a rearwardly extending tang having a slot adjacent its rear end, a U-shaped sheet metal trigger mounting bracket having its bridge generally vertically disposed and aligned with the rear end of said tang slot and with its arms extending forwardly thereof, the bridge of said bracket having a tab extending upwardly through said tang slot and rearwardly to engage an upper surface of said tang, said bracket further having ears extending upwardly from the forward ends of its arms and embracing the vertical faces of said receiver recesses, a retaining pin extending through said bracket ears and said receiver as the single fastening element for mounting said bracket on said receiver, a trigger being pivotally mounted on a pin extending between the arms of said mounting bracket beneath and to the rear of said retaining pin, said sear being mounted on said retaining pin said trigger having a first leg for engaging said sear and releasably holding said sear in its normal position, said trigger further having a second leg extending rearwardly of its pivotal pin and being generally horizontally disposed, a safety member slidably mounted between the arms of said bracket and means for guiding said safety for longitudinal movement between a safe position in which the safety member is in obstructive relation with said second trigger leg preventing disengagement of said first leg from said sear and a firing position wherein the trigger may be moved to disengage said first leg from said sear and the rifle fired, the means for guiding said safety member comprising a thumb piece slidably engaging the upper surface of said tang and joined to said safety member by an integral upright portion extending through said tang slot, a pin extending between the arms of said mounting bracket and engaging a horizontal undersurface of said safety member and a bearing projection extending upwardly from said safety member and engaging the undersurface of said tang intermediate said thumb piece and said bearing member.

2. In a rifle or the like as in claim 1 wherein a raised land is formed on the rear end of said second trigger leg and a safety screw is threaded into the undersurface of said safety member and is disposed above said raised land and in obstructive relation to releasing movement of said trigger in the safe position of said safety member, said safe position being the rearward position of said safety member and said safety member being slideable forwardly to dispose said safety screw in advance of said raised land in the firing position of said safety member.

3. In a rifle or the like as in claim 2 wherein the tang has a second slot spaced forwardly of the first-mentioned tang slot, the bolt has a hub having a notch in its lower surface opening forwardly of said hub and disposed above said second tang slot and wherein the safety member has an upwardly extending projection passing through said second tang slot and entering said notch in the safe position of said safety member to prevent rotative movement of said bolt.

4. In a rifle or the like as in claim 3 wherein longitudinally spaced front and rear notches are formed in the upper surface of said second trigger leg with the rear notch being disposed immediately in advance of said raised land and a spring loaded plunger projects from the lower surface of said safety member and enters said rear notch in the safe position of said safety member and enters the front notch in the firing position of said safety member.

5. In a rifle or the like as in claim 4 wherein the spring loaded plunger is mounted in a vertical hole in said safety member and a compression spring is urged thereagainst by a screw threaded into the upper end of said hole and wherein said screw is accessible through said rear tang slot for adjustment to vary the pressure exerted by said spring on said plunger and thereby vary the force required for pulling the trigger.

6. In a rifle or the like, as in claim 4 wherein the relative spacing between the notches on the rear trigger leg, the raised land thereon, the safety screw, the safety member projection for entering the hub notch are such that in the rear safe position of the safety member the safety screw is in obstructive relation with said raised land and the upwardly extending safety member projection is engaged with the hub notch with the spring loaded plunger entering the rear notch on the trigger leg and when the plunger is disposed intermediate said front and rear notches, the safety screw is in obstructive relation with said raised land preventing releasing movement of said trigger and said upwardly extending safety projection is disposed in advance of said hub notch thereby permitting rotation of said hub and when the plunger enters said front notch the safety member is moved in advance of said raised land and out of obstructive relation therewith.

7. In a rifle or the like comprising a receiver having a lengthwise bore, a bolt slidable therein, said receiver having a tang extending rearwardly thereof with a slot formed adjacent its rear end, a U-shaped trigger mounting bracket having its bridge vertically disposed and aligned with the rear end of said tang slot with its arms extending forwardly thereof, the bridge of said bracket having a tab extending upwardly through said tang slot and rearwardly to engage an upper surface of said tang, said bracket being secured to said receiver by a single retaining pin extending through the forward ends of the bracket arms and a portion of said receiver, a trigger pivotally mounted on a pin extending between the arms of said mounted bracket, said trigger having a sear engaging portion and a horizontal rearwardly extending leg, a safety member slidably mounted between the arms of said bracket and guided for horizontal movement between a rearward safe position and a forward firing position, a spring loaded plunger slidably mounted in a vertical hole formed in said safety member, a compression spring bearing against said plunger and urging it downwardly into engagement with said trigger leg, said spring being confined at its upper end by a screw threaded into said vertical hole, front and rear notches formed in said trigger leg and spaced apart a distance approximating the movement of said safety member between said safe and firing positions and in combination with the plunger serve as detent means for said safety member as well as providing the means for urging said trigger into latching engagement with said sear.

8. In a rifle or the like as in claim 7 wherein a screw is threaded into said safety member forwardly of said plunger and depending therefrom and obstructively engaging said second trigger leg upon a predetermined travel of the leg past that necessary to release the sear.

9. In a rifle or the like comprising a receiver having a lengthwise bore, a bolt slidable therein, said receiver having a tang extending rearwardly thereof with a slot formed adjacent its rear end, a U-shaped trigger mounting bracket having its bridge vertically disposed and aligned with the rear end of said tang slot with its arms extending forwardly thereof, the bridge of said bracket having a tab extending upwardly through said tang slot and rearwardly to engage an upper surface of said tang, said bracket being secured to said receiver by a single retaining pin extending through the forward ends of the bracket arms and a portion of said receiver, a trigger pivotally mounted on a pin extending between the arms of said mounted bracket, said trigger having a sear engag-

ing portion and a horizontal rearwardly extending leg, a safety member slidably mounted between the arms of said bracket and guided for horizontal movement between a rearward safe position and a forward firing position, a spring loaded plunger slidably mounted in a vertical hole formed in said safety member, a compression spring bearing against said plunger and urging it downwardly into engagement with said trigger leg, said spring being confined at its upper end by a screw threaded into said vertical hole, front and rear notches formed in said trigger leg and spaced apart a distance approximating the movement of said safety member between said safe and firing positions to serve as detent means for said safety member

and with said spring loaded plunger to provide the means for urging said trigger into latching engagement with said sear.

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CLASS 42 SUB 70

Use F

SEE F.S.S. 12-15

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TRIGGER SAFETY FOR BOLT ACTION RIFLE

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3-POSITION SAFETY. (SEE Col. 9)

Fig. 1.

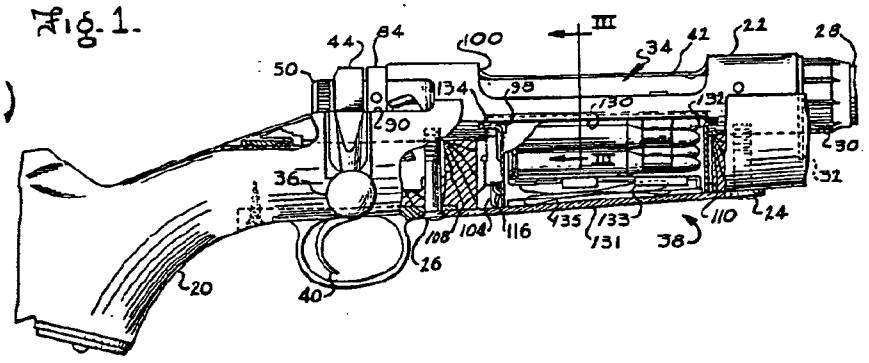

Fig. 2.

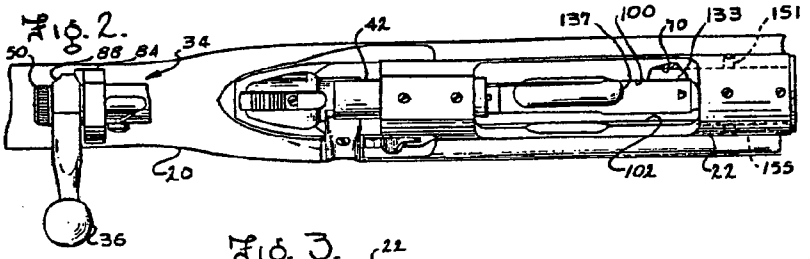

Fig. 3.

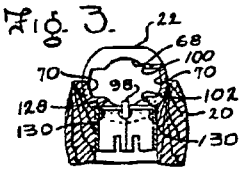

Fig. 4.

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Fig. 6.

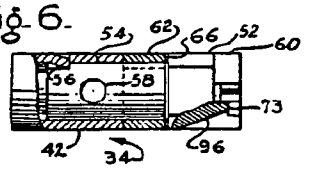


Fig. 5.

Fig. 7.

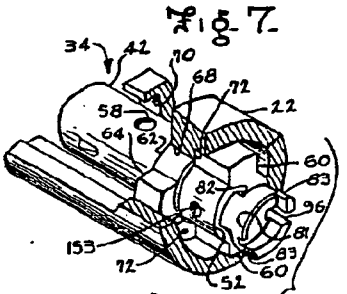


Fig. 8.

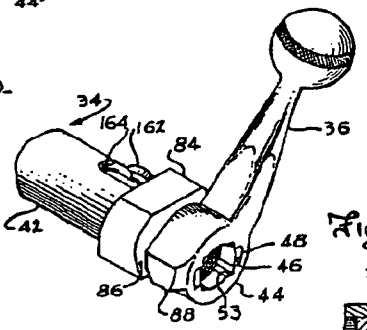


Fig. 9.

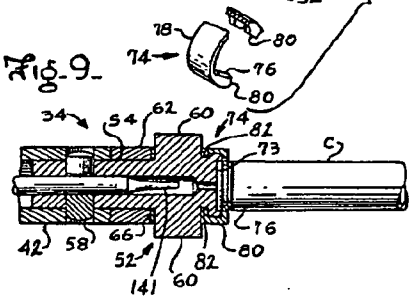


Fig. 10.

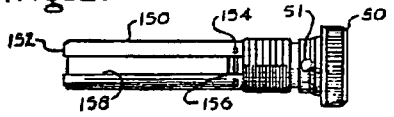
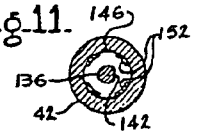


Fig. 11.



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TRIGGER SAFETY FOR BOLT ACTION RIFLE

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Fig. 12.

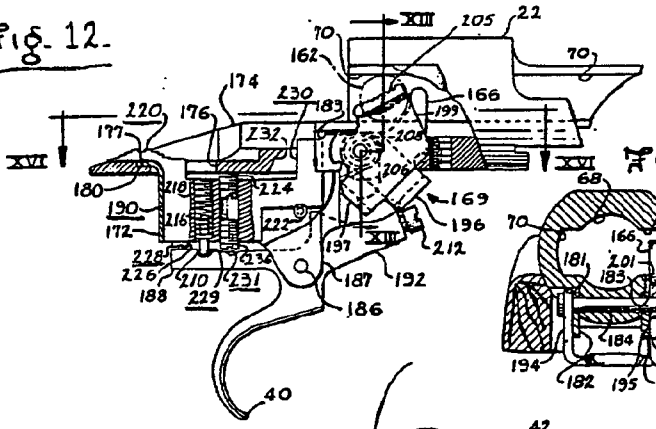


Fig. 13.

Fig. 14.

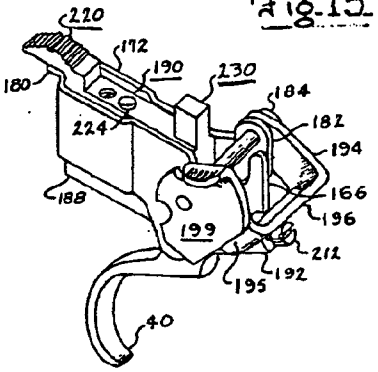


Fig. 15.

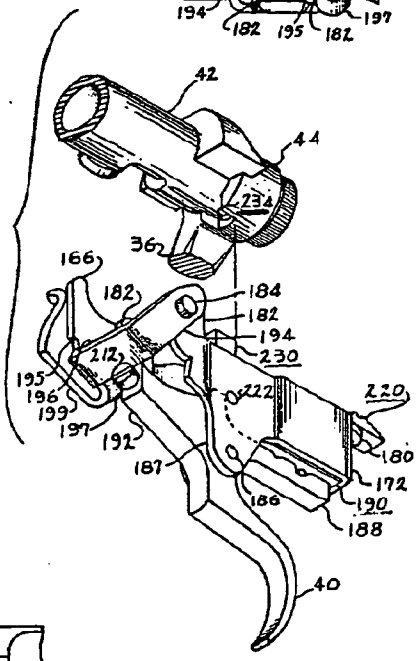
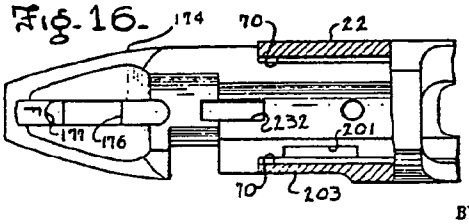


Fig. 16.



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