MULTI-PART BREECH BOLT MECHANISM

Wallace B. Butler, Branford, Conn., assignor to Olin Mathieson Chemical Corporation, New Haven, Conn., a corporation of Virginia

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This invention relates to a firearm and more particularly to a rifle having a novel lever action.

A most desirable lever action rifle is one low in cost, light in weight, safe in operation, easy to operate and useful in firing both low and high powered ammunition. To be low in cost, it must be economically manufactured. To be light in weight, it must be constructed of parts of small dimensions and/or of light weight material. To be safe in operation, it must be capable of being reloaded and rearmed while the hammer, the trigger and the firing pin are automatically made inoperable, inaccessible or incapable of causing firing while the lever is in the unatched position. To be easy to operate, a minimum amount of effort should be possible for rearmining, reloading and recocking the gun. And to be useful for firing high powered ammunition, the strength of the material employed and of the assembly when in battery position must be capable of withstanding forces applied to the locking mechanism by high pressure generating propellants. Heretofore, no such gun has ever been successfully produced.

An object of this invention is to provide a lever action rifle of novel, low cost design. Another object of this invention is to provide a lever action rifle capable of firing high powered ammunition even though light in weight. And another object of this invention is to provide a lever action rifle having an unusually short lever stroke enabling quicker and easier loading, arming and cocking of the rifle. Another object of this invention is to provide a lever action rifle having a linkage design which has a high mechanical advantage at the beginning of the opening stroke to provide maximum force for unlocking the bolt and for primary extraction, low mechanical advantage during the main part of the stroke to provide high bolt travel velocity, and moderately high mechanical advantage at the end of the stroke to provide adequate force for stripping a cartridge from the magazine at the beginning of the closing stroke. A further object of this invention is to provide a lever action rifle having a superior breech locking ability due to its use of a rotatable bolt capable of accelerated rotating speed caused by a novel arrangement of links and cam surfaces. A still further object of this invention is to provide a lever action rifle having a bolt which acts as the closure for the ejection port of the receiver. And a still further object of this invention is to provide a lever action rifle having a free floating receiver in order to facilitate takedown of the gun. Another object of this invention is to provide a lever action rifle which, even though in cocked condition, is safe from accidental firing should the lever be actuated because the cocking mechanism is locked within and moves with the guard assembly connected to the lever. Another object of this invention is to provide a lever action rifle wherein the trigger at all times pivots within the lever thus providing an additional safety against accidental firing of the gun. And another object of this invention is to provide a lever action rifle having an automatic hammer and trigger locking mechanism which prevents accidental firing when the bolt is in non-battery position. Another object is to provide a novel trigger safety capable of right or left-hand operation. Another object is to provide a novel magazine assembly. Another object is to provide a novel closure means completely sealing the ejection port of the gun. Other objects will become apparent to those skilled in the art upon reading the following detailed disclosure, in which:

Figure 1 is a partial vertical view of the lever action rifle of this invention as it appears when in a cocked and a ready fire position,

Figure 2 is a partial vertical view of the lever action rifle of this invention as it appears when in an open-action position, with the lever fully pivoted, and the bolt completely rearward,

Figure 3 is a perspective view of the receiver, receiver sideplates, bolt assembly, front and rear links, lever guard assembly, recoil abutment, guard latch, hammer catch, rear link pin and magazine spacer shown in position for assembly into the lever action gun of this invention,

Figure 4 is a perspective view of an assembly of the hammer, hammer spring, trigger, trigger safety, hammer lock, hammer catch and guard latch used in the lever action gun of this invention,

Figure 5 is a perspective view of the trigger used in the lever action gun of this invention,

Figure 6 is a right front perspective view of the hammer lock shown in Figure 4,

Figure 7 is a right rear perspective view of the hammer lock shown in Figure 4,

Figure 8 is a cross sectional view of the trigger safety shown in Figure 4, showing its operation upon the trigger while in an "off" position,

Figure 9 shows a fragmentary, perspective view of the bolt assembly and front links used in the rifle of this invention,

Figure 10 is a vertical cross-sectional view of forward section of the bolt assembly shown in Figure 9 taken on line 10—10,

Figure 11 is a left front perspective view of the bolt assembly shown in Figure 9 particularly showing the operation of the bolt sleeve lock pin,

Figure 12 is a broken left front perspective view of the receiver, receiver sideplates, magazine spacer and part of the barrel of the gun of this invention showing particularly the bolt sleeve lock pin horizontal and vertical sliding channels, and

Figure 13 is a cross sectional view of the receiver of Figure 12 taken on line 13—13.

The objects enumerated above are accomplished, broadly speaking, by constructing the lever-action rifle with a reciprocating bolt of the rotatable locking type to which a set of toggle jointed links are connected. The rear links of each set contain angular slots in which ride lever studs of the lever of the gun, the slots being so designed as to enable a short lever stroke having an optimum mechanical operating advantage upon the action of the gun. Pivotable safety members; namely, a hammer catch, a hammer lock, a disconnecter and a trigger pull safety operated by the lever latch of the gun prevent premature firing. A novel cross pin safety adjustable for either left or right hand operation prevents accidental firing. A novel method of affixing the barrel to the one piece gun stock with a barrel stud screw cooperating with a recoil block designed to act as a "boss" over the receiver incorporates a floating receiver feature into the gun. And a novel use of the bolt body to completely close the ejection port provides a gun having light weight, high strength, safe operation, useful for high and low powered ammunition firing, easy to disassemble and having features for clean operation under highly adverse conditions.
As seen in the figures of the drawing, the lever action rifle of this invention has a receiver 1 into which a barrel 2 having a chamber section 3 threadably engaged to the forward end of the receiver, is secured. The barrel 2 has a forearm stud 4 extending downward from its underside. The stud 4 is affixed to the barrel 2 by a barrel dovetail slot 5. A forearm screw 6 extends through the forward part of gunstock 7 and is threaded into stud 4 to secure the gun action to its stock. The receiver is of hollow design, being tubular in shape at its forward end and inverted U shape at its rear end. Two receiver sideplates 11 and 12 extend downwardly from the ends of the inverted U-shaped section of the receiver 1. Each sideplate is riveted to the receiver by rivets 13. A recoil block 14 closes off the rear end of the receiver 1. Body 15 of the block 14 locates the receiver with respect to the block. Within the hollow of the receiver is the bolt assembly 16 which is capable of reciprocable movement within said receiver (see Figures 1, 3 and 12 and 14 especially). The bolt assembly has an outer bolt sleeve 17. The sleeve is of elongated cup design with indents 18 on its rear surface. It operates a rotatable bolt 21 through the action of a bolt carrier 22 and a pin 23. Pin 23 extends diametrically through the carrier 22 and through a vertically disposed elongated sleeve slot 24 on the left side of the sleeve (see Figure 14). When the bolt assembly 16 is in operation within the receiver 1, the pin extends into a horizontally disposed pin riding channel 25 on the inner surface of the receiver (see Figure 12). The channel 25 connects with a vertically disposed radial groove 26 having an off-center mid point to the axis of the receiver. The purpose of the channel and groove is to permit rotary swinging as described below of pin 23 only when the action is almost closed. Pin 23 has an elongated slot 27 through its body. A flat 28 on the firing pin fits through the slot and the slot acts against the flat. The pin 23 is cammed by a cam slot 32 within the bolt carrier 22 to cause a rotary swinging of said pin. Through such rotary movement the bolt and the firing pin rotate about their axis. Extending radially from the outer surface of the rotatable bolt are locking lugs 33, 34 and 35. These lugs engage radially inwardly extending lugs 36, 37 and 38 of the receiver, when the bolt is completely rotated and in battery position.

Within an axial cavity in the sleeve 17 (see Figures 1 and 9 especially), the bolt carrier 22 and the bolt 21 is contained by a firing pin 31 having on its body. The pin extends rearwardly through the rear wall of the sleeve. A firing pin head 41 is secured to this rearward extending portion of the firing pin by welding, brazing, soldering or the like. A firing pin spring 42 encircles the firing pin and spring loads it to the rear by being biased against annular shoulder 43 of the pin. The firing pin head has forwardly extending lugs 44 (see Figures 9 and 11 respectively especially) which when properly aligned, enter into the indents 18 on the rear surface of the sleeve 17. Front link pin 45 and firing pin retaining pin 46 act to retain the firing pin, and the spring within the axial cavity of the bolt sleeve.

Partially disposed vertically across the rim portion of the cartridge seat face 47 of the bolt 16 is a claw-like extractor 33 (see Figure 10 especially). Extractor plunger 51 which extends longitudinally into a cavity 52 within the locking lug 33 of the bolt and which contains an extractor spring 36, secures the claw-like extractor to the bolt. The bolt also has an ejector cavity 54 in which is contained an ejector 55 held in place by an ejector pin 56 (under spring 57). The ejector is spring loaded forwardly by an ejector spring 57 to cause pressure against the base of the cartridge case abutting against the cartridge seat face 47 of the bolt.

Rearward of the bolt assembly is a lever-guard assembly 61 pivoted to rotate about hammer pin 62. The assembly 61 at its lower forward extremity is of hollow, oval (bow) shape to form a trigger guard 63 for the fingerpiece 64 of the trigger member 65. Within a cavity in the rear portion of the guard is a trigger stop 66 cammed forward by an adjustable trigger stop screw 67 within the lever. There is a slot 68 through which the trigger member 65 extends upwardly. The guard 63 also has an angular safety cavity 71 at its forward end and indent 72 in the guard assembly to receive safety 73 described below (see Figure 8). Affixed to the upper surface of the bow-shaped trigger guard are two upwardly extending, triangularly shaped, flat or wing members 73 and 74, the flats of which are parallel to the rearward surface of said guard and enclose the hammer assembly of the gun as discussed more fully below. At the upper extremity of each of these triangularly shaped members and extending outwardly therefrom are two wing or guard studs 75 and 76 (see Figure 3 especially). These act as cam followers within cam slots 77 and 78 of rear links 81 and 82. On the rear edges of the triangularly shaped members of the guard are recesses 83 and 84, having abutment faces on their upper edges for engagement by the guard latch 85 to lock the guard in a closed and latched position, that is, an uppermost pivoted position.

Angular bow-shaped finger lever 86 pivoted for rotation about finger lever pin 87 extends from the rear portion of the trigger guard 63. Finger lever spring 88 mounted within a cavity 89 within the trigger guard 63, spring loads the lever at its forward and upward position in the finger lever pin 87. An adjustable trigger stop screw 67 acting as a cam against trigger stop 66 resides within a threaded cavity 91 on the outer edge of the lever just below lever pin 87. Extending upwardly from said finger lever at its most forward and upward portion is a guard latch release cam 92 which acts upon the guard latch 85 by camming its lower portion to the rear when the finger lever is pivoted downwardly against the force of the finger lever spring 88.

Within the two upward extending triangular wing members 73 and 74 of the guard and pivoted upon hammer pin 62 is hammer 93 (see Figure 4 especially). It has a firing pin striking surface 94. Extending from said striking surface is a T-shaped lug 95 which acts as the cocking shoulder of said hammer. The lug contains a front cocking shoulder 96 and a rear cocking shoulder 97. The hammer has a hammer catch shoulder 98. The front cocking shoulder of the T-shaped lug can be considered the rear engaging shoulder while the rear cocking shoulder of the hammer can be considered the disconnecting engaging shoulder.

Secured to the hammer at a point just above the hammer pin 62 is a hammer spring guide rod 101 (see Figure 2). It is pivoted to the hammer by hammer spring guide rod pin 102. The hammer spring guide rod has an elongated cup shaped hammer spring guide 103 telescoped over it. The hammer spring guide 103 has a cap thereon beneath which is a hammer spring 104. This spring loads the hammer spring guide 103 against the trigger member 65 at a point above the trigger pin 105. By such location, it tends to pivot the trigger member 65 about the trigger pin 105 in a counterclockwise fashion. The other end of the hammer spring assembly, by being affixed to the hammer at a point just above the hammer pin 62 spring loads the hammer when compressed so that the hammer will rotate about the hammer pin 62 with great speed and force.

As stated before, the trigger member 65 consists of a downwardly extending firing piece 64 and is pivoted at trigger pin 105 (see Figures 1, 2 and 4 and 5 especially). It has an upwardly extending Y-shaped member 106, each arm of which engages one of the cocking shoulders of the hammer. The rear arm of the disconnecter and the forward arm 108 acts as the firing piece. The trigger also has a forwardly extending safety member 109 that engages a safety of the cross-bolt type. Extend downwardly from said safety arm 109 of the trigger.
is a safety lug 110 which engages the cross-bolt safety 80 of the gun. The safety 72 of the gun comprises a horizontally disposed cross rod 111 having an upward facing notch 112 therein which when aligned under safety lug 110 permits downward movement of the safety member 109 of the trigger member 65. The safety is "off" when such movement is possible. The safety is "on" when lug 110 is misaligned with notch 112 so that lug 110 is stopped from downward movement by the round body of the cross rod 111 (see Figure 4). At each end of the rod are finger pieces 113 and 114 which by appropriate finger pressure by the shooter align or misalign notch 112 with safety lug 110. Spring biased against the rod is a plunger 115 and a plunger spring 116 which with downward facing double grooved notch 117 on the rod, acts as a ratchet in the movement of said safety. Appropriate left or right handed operation of the safety can be effected by merely reversing the disposition of cross rod 111 with respect to its finger pieces 113 and 114. This is done by disengaging plunger 115 and plunger spring 116 from notch 117 by turning rod 111 ninety degrees. The rod 111 is removed, reversed and reinserted into the cavity. Pivotted for rotation about trigger pin 105 is a hammer lock 121 (see Figures 1, 2, 6, 7). With it in diagonally downward extending portion 122 is contained a trigger spring 123, the force of which is adjustable by a cap-shaped trigger spring adjusting screw 124. The hammer lock's upward extending portion 125 is of a forwardly opening channelled structure and has engaging shoulders 126 thereon on its forward edge for engagement with the rear cocking shoulder 97 of the hammer 93. It acts to lock the cocked hammer as well as to operate the hammer catch described below. Approximately rearward of said hammer lock 121 is a guard latch 85 pivotted to rotate about rear link pin 127 (see Figures 3 and 4 especially). The lower extending portion of the guard latch contains guard latch lugs 128 for engagement with the recesses 83 and 84 of the tri- angularly shaped members 73 and 74 of the guard 61. Said lugs 128 are spring loaded against the triangular members by guard latch spring 131 abutting against guard latch abutment 132a which is affixed to the receiver sideplates 11 and 12 of the gun through rear link pin 127. The lugs bear against the hammer lock 121 at its downward extending portion 122. Also pivotted to the rear link pin 127 is a pair of rear links 81 and 82 which operate outside but parallel to the triangularly shaped wing members 73 and 74 (see Figure 3 especially). They contain cam slots 77 and 79 into which wing studs or cam followers 75 and 76 extend. At the rearmost portion of the front links and integral therewith are link connector pins 132 and 133 which extend inwardly and connect, in a pivoting fashion, the rear links 81 and 82 and the front links 134 and 135. The linkage is basically a toggle joint. The front links operated outside the rear links are connected to the bolt sleeve lock 12 and are capable of pivoting about front link pin 45. The front ends of the front links 134 and 135 reciprocate during action of the lever within two downward facing grooves 136 and 137 on the side under surface of the sleeve 17 (see Figures 12 and 14). Annular orifice 138 on one side of the sleeve 17 permits insertion of the front link pin 45 during assembly. Pivotted upon magazine lock pin 162 which is disposed across the cavity. The lower end of the magazine lock fits out into a fingerpiece 163. A magazine lock spring 164 biases the upper end of the magazine lock against the front surface of the magazine to lock it in place. To disengage the lock, pressure is applied against the fingerpiece and the upper end pivots out of engagement with the magazine case 146. The entire assembly is affixed to and resides within a longitudinal cavity within gun stock 7. Forearm screw 6 holds the assembly to the stock while inclined surfaces load the assembly rearwardly. The separate recoil block 14 is affixed to the stock 7 by a recoil block screw 165 which extends through a longitudinal cavity within the shoulder piece of the gun stock. The boss 15 of the recoil block 14 holds the receiver to the stock in substantially "loose" fashion thereby effecting a "floating" receiver. The gun may also have a rear sight 166, a pistol grip 167 and the like. Obviously, parts not shown such as a front sight, swivels, a butt plate, etc., can also be affixed to the gun of this invention if desired. These have not been shown due to the obvious and known manner of application. Assuming that the gun has just been fired and that a cartridge case is present in the chamber section of the barrel, the parts of the gun operate in the following manner. The shooter first grasps the finger lever 86 and pulls it downwardly and forwardly. In so doing, the lever pivots counter-clockwise about finger lever pin 87 and trigger stop screw 67 cams against trigger stop in which turn cams against finger piece 64 of the receiver to prevent its rearward movement. Guard latch release cam 92 of the lever cams against the guard latch 85 and forces its lower end rearwardly to compress guard latch spring 131. Such movement of the guard latch causes it to release the recesses 83 and 84 of the wing members 73 and 74 of the guard. Simultaneously, with such release, the upper end of the guard latch 85 also pivots clockwise allowing the hammer catch 142 to move over the hammer 93 as the hammer lock 121 pivots clockwise by force of trigger spring 143. Movement of the hammer lock releases the hammer catch 142 and it pivots counter-clockwise until it reaches its stop point. The entire guard assembly including the trigger-
bly, the hammer spring assembly, the hammer lock assembly and the safety pivot about the hammer pin 62. As the guard assembly pivots about the hammer pin, the wing studs or cam followers 75 and 76 move rearwardly and downwardly while contained within the two cam slots 77 and 78 of two rear links 81 and 82. Such movement causes the rear links to pivot in a clockwise fashion about rear link pin 127. As the lever guard and rear links pivot downwardly, the two front links 134 and 135 are pulled rearwardly through link connector pins 132 and 133 by the force of said downward pivoting movement. As these front links travel rearwardly, they pivot downwardly in a counter-clockwise fashion about front link pin 45. This action continues until the guard assembly has rotated its full stroke or through an angle of approximately 60°. The rear links 81 and 82 will have been rotated about rear link pin 127 to a substantially vertical position, i.e., substantially vertical to the center line of the gun. The back ends of the front links will be in their most completely downward position with the links at an angle to the center line.

Simultaneously, with the pivoting of the front and rear links and with the opening of the toggle joint, the carrier 22 is pulled rearwardly. At first in being so pulled, it causes pin 23 to rotate in "propeller" fashion by the helical cam slot 32 within the carrier 22 and since 21 is fixed to the bolt 21, the bolt subse-

quent travels rearwardly but is not rotated in such movement because the pin 23 has moved to the extreme rear position of the cam slot 32. Pin 23 also causes rotation of the firing pin 31 through action of the pin's slot 27 against flat 28 of the firing pin. By such rotation, the lugs 44 of the firing pin head 41 are misaligned from in-

dents 18 on the rear surface of the sleeve 17. A safety against firing thereby results since the firing pin is now unnable to be hammered completely forward. By proper positioning and design of the cam slots 77 and 78 within the rear links 81 and 82, the relationship of finger lever travel to bolt rotation can be varied. In the gun shown in the drawings, one half or 30 degrees of the total lever stroke is used to rotate the bolt and the remaining half of the lever stroke is used to completely retract the bolt. This effects a short lever stroke with a maximum of breech lock strength. This is performed in the rifle shown by the angular shape of the slot wherein a substantial part of travel upon the lever cam slot surface shown in Figure 11 effects rotation of the bolt. When the bolt is fully rotated, there is a vertical cam surface shown in Figure 11 comes into play and steps up the lever advan-

tage to break the cartridge seal and to start retraction of the bolt. Subsequently, the lever advantage is stepped down to cause a maximum speed for bolt travel. The bolt in being uncocked disengages its locking lugs 33, 34 and 35 from lugs 36, 37 and 38 of the receiver.

Rearward movement of the bolt sleeve assembly causes retraction of the fired cartridge case from the chamber 3 of the barrel 2 by extractor 48. When the bolt sleeve assembly reaches a point wherein the front tip of the ex-

pended cartridge case clears the ejection opening 167 on the right side of the receiver (see Figure 10), the ejector 55 ejects the case by pivoting it about the ex-

tractor through the ejection opening.

The rearward movement of the bolt sleeve assembly also causes pivoting of the hammer 93 in a counterclockwise fashion since the assembly moves against the hammer. The hammer pivots in a counter-clockwise fashion until it is in an almost horizontal position where its hammer catch shoulder 98 is engaged by the hammer catch lever 87 which has been pivoted in a counter-clockwise fashion by the force of hammer catch spring 144. It is thus held in a position for subsequent engagement by the Y-shaped member 106 of the trigger member 65.

As the lever is pivoted back to its original firing position, that is, clockwise, the bolt assembly is driven for-

ward. During its forward travel, the bolt 21 engages cartridge 150 which has been dispensed upwardly by the magazine spring 148 and drives it into the chamber section 3 of the barrel 12.

The last 30 degrees of travel of the lever into its fire position is used to rotate the bolt in a clockwise fashion to engage its locking lugs 33, 34 and 35 with the in-

wardly direction lugs 36, 37 and 38 of the barrel. Also, as the lever nears its seating position, i.e., its closed and latched position, the rear surfaces of the guard 61 cam the guard latch 85 to pivot it clockwise. This clockwise pivoting or retraction of the guard latch causes a clock-

wise pivoting of the hammer latch 122 which in turn cams the hammer 93 to pivot in a counter-clockwise fashion downward to meet the rising Y-shaped member 106 of the trigger. Depending upon the position of the trigger, either the rear or disconnecter shoulder 107 or the front or sear shoulder 108 of the Y-shaped member engages the rear cocking shoulder 97 or the front cocking shoulder 96 respectively of the T-shaped lug 65 of the hammer. Complete seating of the lever causes the guard latch 85 to engage the recesses 83 and 84 of the guard and thereby lock it. In so doing, it causes the hammer lock 121 to pivot counterclockwise about the trigger pin and thereby retract the hammer catch 142 and compress the hammer catch spring 144 to disengage the hammer catch from the hammer catch cocking shoulder 98 of the hammer. If the trigger finger piece 64 has been depressed while oper-

ating the lever and the trigger is released, then the trigger pivots counterclockwise about the trigger pin 105 and the disconnecter or rear arm 107 of the trigger is disengaged from the rear cocking shoulder 97 of the hammer. The hammer rotates clockwise but the front arm or sear 108 of the trigger member 65 then engages the front cocking shoulder and the gun is ready to be refired. The safety 72 may now be operated by depressing the left hand finger piece 113 towards the right. This causes safety lug 110 of the trigger to be disposed above the unnotched portion of the safety rod 111 and the trigger 65 is locked against clockwise pivoting about trigger pin 105. Should the shooter be left-handed, the safety may be operated in reverse fashion by completely removing the safety assembly and reversing it in the annular cavity of the trigger guard. The trigger may be pulled when the safety 72 is placed in an "off" position by depressing the right hand finger piece 114 to the left or vice versa depending on the safety's left or right hand operator as discussed above.

In firing the gun, the finger piece 64 of the trigger is depressed to rotate the trigger member 65 about its trigger cocking shoulder 96 of the hammer 93. The hammer pivots about hammer pin 62 by the force of compressed hammer spring 104. The hammer striking surface 94 of the hammer strikes against the head 41 of the firing pin, and drives it against the slight force of the firing pin spring 42 into the igniter of the cartridge contained within the chamber of the gun to fire the gun.

The gun is reloaded and rearmed using the method described above.

Should the lever be operated without firing the cartridge, that is, with the hammer cocked, the action described hereinafter occurs. The lever 86 pivots about the finger lever pin 87 to unlock the guard latch 85 from engagement with the clawlike slots 83 and 84 of the guard 61. In unlocking the guard 61, the guard latch 85 pivots clockwise to release the hammer lock 121 which then pivots clockwise by force of trigger spring 123. Movement of the hammer lock releases the hammer catch 142. The hammer catch spring 144 causes counter-clockwise move-

ment of the hammer catch to engage the hammer 93 at its hammer catch shoulder 98. Continued movement of the guard 61 causes downward camming of the hammer 93 by the hammer catch 142 acting through the guard latch 85. Hammer lock 121 then engages the disconnecter cocking shoulder of the hammer to lock it in a cocked
position. Immediately after engagement of the hammer lock 121, the recesses 83 and 84 of the wing members 73 and 74 of the guard are released by the guard latch 85. Since the hammer lock has locked the hammer against movement, the lever can be safely rotated without fear of releasing the hammer to cause firing while the bolt is in non-battery position. The guard assembly that rotates about the hammer pin in this case as compared to that described above, comprises the lever, the trigger assembly, the hammer spring assembly, the hammer, the hammer lock assembly and the safety. Complete rotation of the lever about the hammer pin, therefore, occurs while the hammer is not only locked in a cocked position but also while the hammer pivots about its pin without further compression of the hammer spring. Any movement of the trigger during operation of the lever has no effect upon the hammer since it is locked by the hammer lock.

When the lever is returned to its ready-fire position, the hammer lock 121 becomes disengaged from the hammer by the force of the guard latch 85 camming against the diagonally downward section 122 of the hammer lock 121. The gun can now be fired during which the action described above occurs.

The gun described herein is subject to obvious modifications but such modifications are to be construed within the purview of this invention.

The invention having thus been described, what is desired to be secured by Letters Patent is as follows:

1. In a firearm including a receiver, a bolt mechanism comprising a protective sleeve slidably mounted and operable to reciprocate within the receiver, a bolt having a bore and carrying a transversely disposed pin rotatably mounted within the sleeve, a bolt carrier having a cam slot slidably mounted within the sleeve and having a portion thereof projecting into the bore of the bolt, said cam slot and said pin cooperating in conjunction with the receiver and the sleeve to rotate the bolt with respect to the sleeve and with respect to the carrier and to reciprocate the sleeve, the carrier and the bolt as a unitary assembly in sequential fashion.

2. In a firearm including a receiver, a bolt mechanism comprising a protective sleeve slidably mounted within the receiver, a bored bolt rotatably mounted within the sleeve and carrying a transversely disposed pin, a bolt carrier formed with a cam slot slidably mounted within the sleeve and projecting into said bored bolt, said carrier being connected to the bolt by means of said pin and said slot, said carrier being operable to rotate the bolt with respect to the sleeve and to reciprocate the sleeve and the bolt as a unit thereby said cam slot and said pin are protected from the deleterious effect of soil matter during said rotational and said reciprocal motion.

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