United States Patent [19]

Atchisson

[11] **3,850,076**

[45] **Nov. 26, 1974**

[54] **FIREARM APPARATUS**

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[22] Filed: **May 3, 1972**

[21] Appl. No.: **250,006**

[52] **U.S. Cl.** **89/196,** 42/16, 89/199

[51] **Int. Cl.** **F41c 7/00**

[58] **Field of Search** ..... 89/194, 195, 196, 197, 89/199; 42/16, 75 L

[56] **References Cited**

UNITED STATES PATENTS

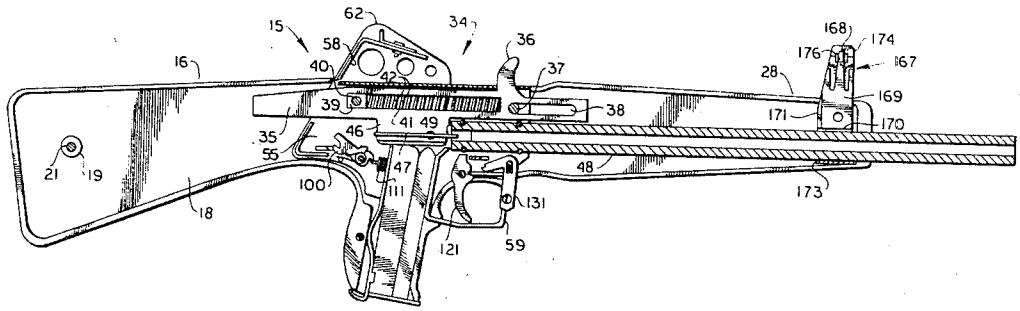
992,854	5/1911	Cobb	89/196
1,352,412	9/1920	Payne	42/16
2,920,538	1/1960	Lizza	42/16
3,318,192	5/1967	Miller et al.	89/199

Primary Examiner—Stephen C. Bentley
Attorney, Agent, or Firm—Jones, Thomas & Askew

[57] **ABSTRACT**

Firearm apparatus embodied in a semi-automatic, blowback operated rifle. The firearm includes a receiver made of two plates spaced apart to receive a bolt mechanism including a bolt mounted for reciprocal motion within a channel-shaped member; the operating spring for the bolt assembly is received in a slot within the bolt and is retained in place by the channel-shaped member. A unitary firing pin/extractor carried by the bolt functions as a firing pin and also provides multiple extractor functions. A simplified firing mechanism includes a hammer positioned to the rear of a cartridge magazine and operatively connected by a three-finger sear bar to a trigger mounted in front of the magazine. A safety mechanism is provided in conjunction with the trigger guard. Numerous components of this firearm apparatus provide multiple functions contributing to the economy and efficiency of the present firearm apparatus.

16 Claims, 11 Drawing Figures



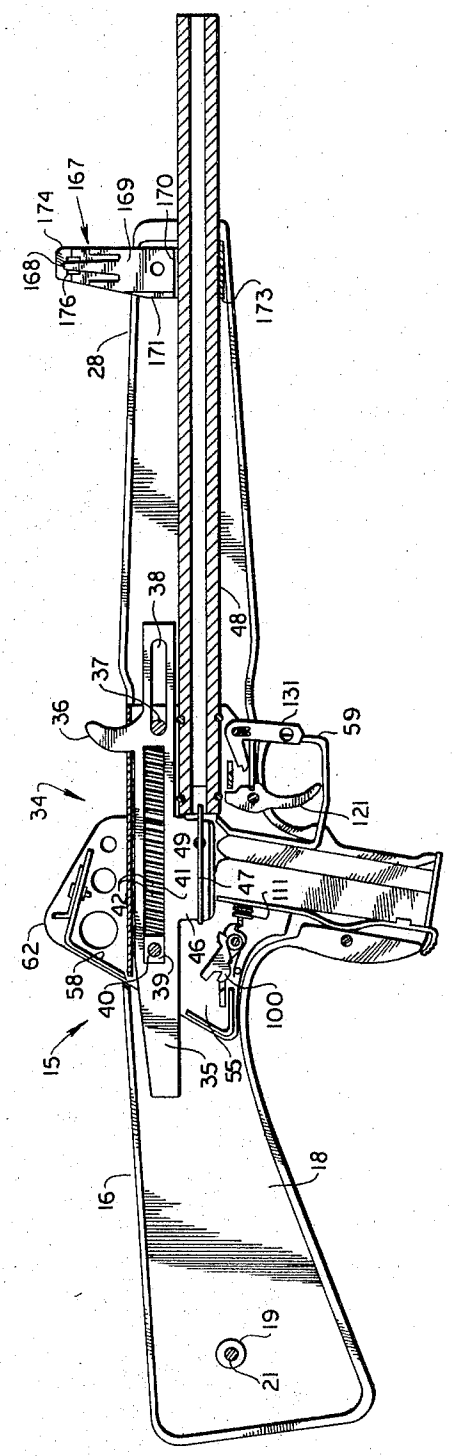

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FIG 1

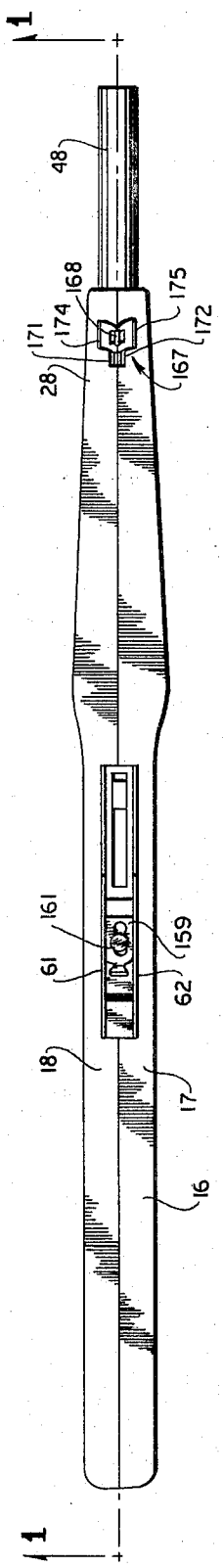
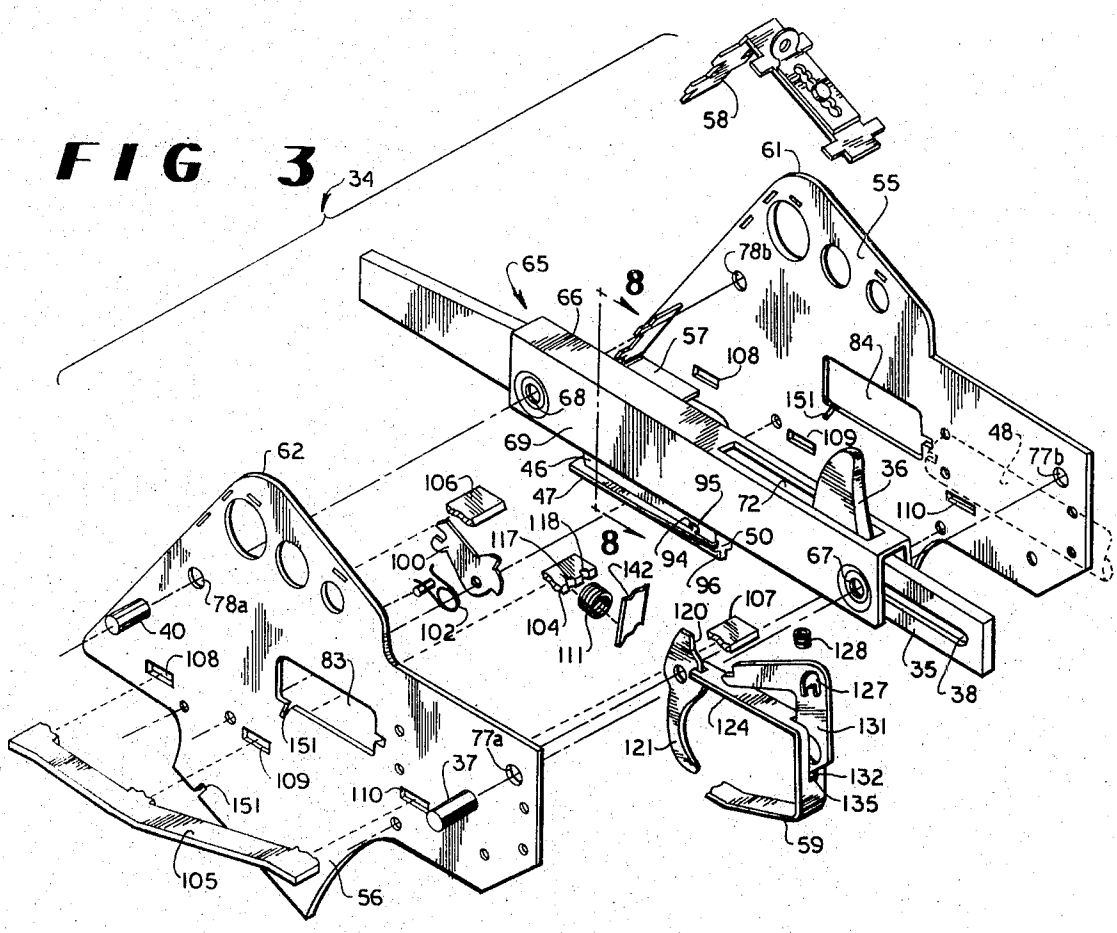

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FIG 2

FIG 3


58
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78b
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84
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151
109
48
77b
69
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100
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142
78a
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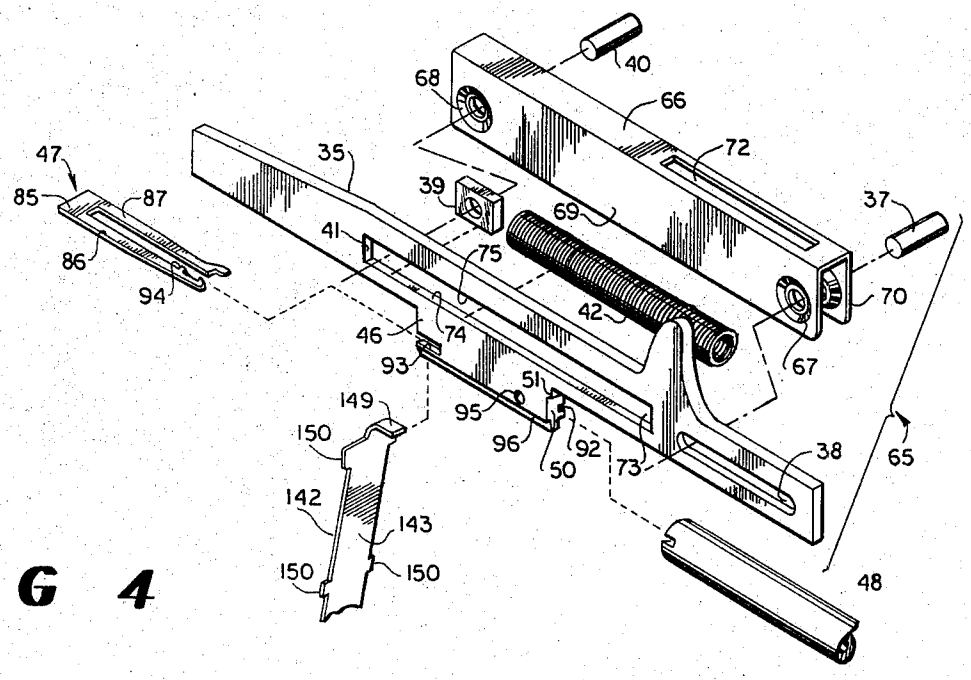

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FIG 4

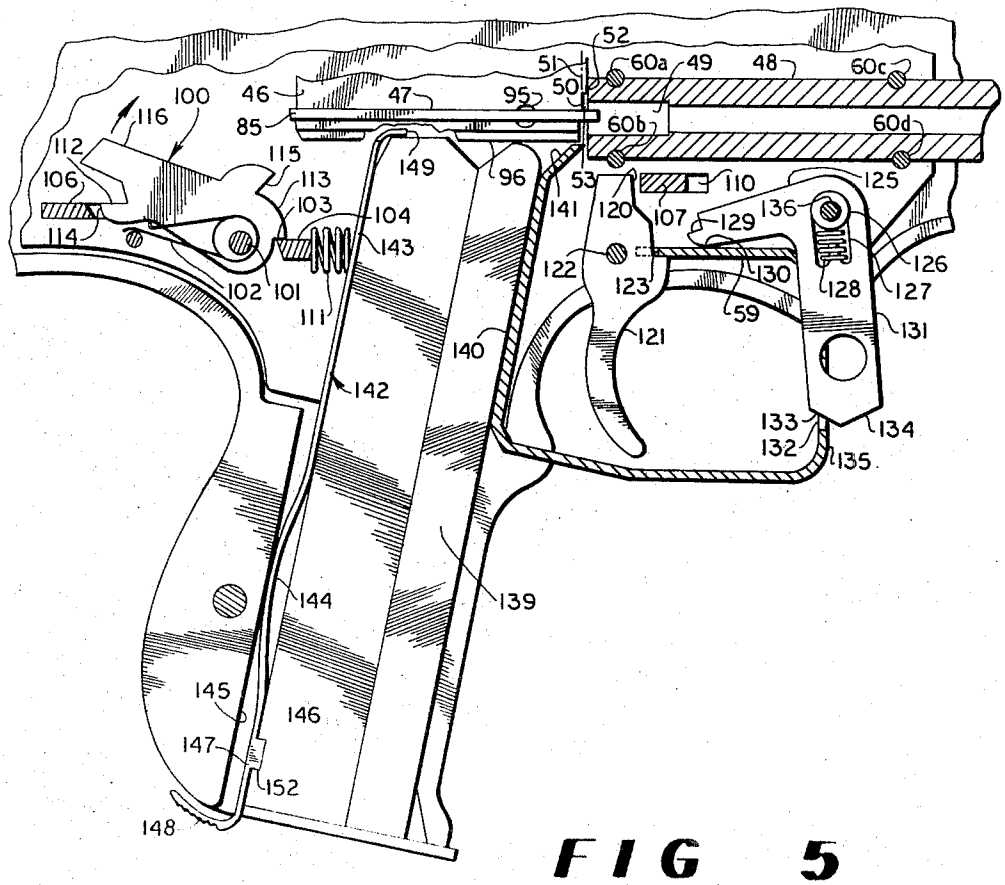


FIG 5

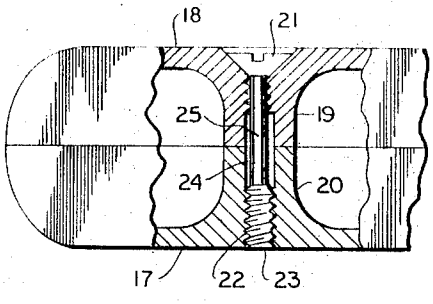


FIG 6

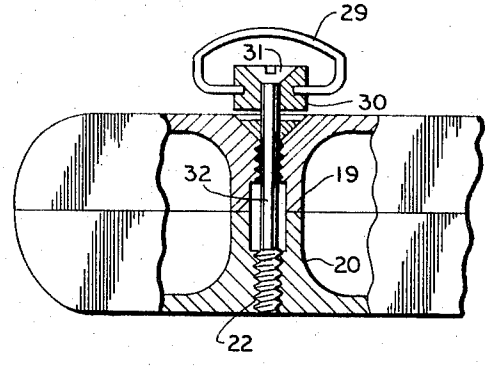


FIG 7

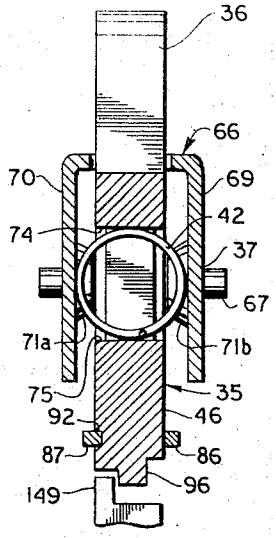


FIG 8

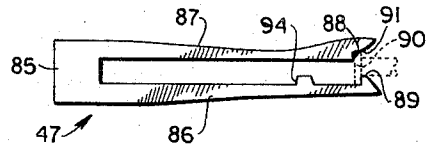


FIG 9

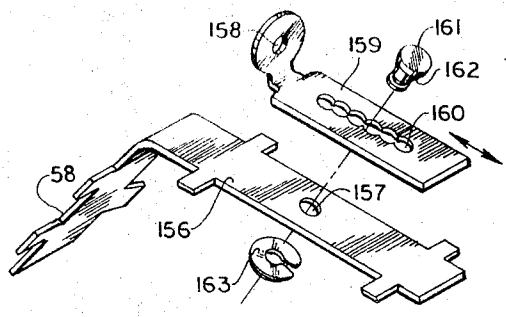


FIG 10

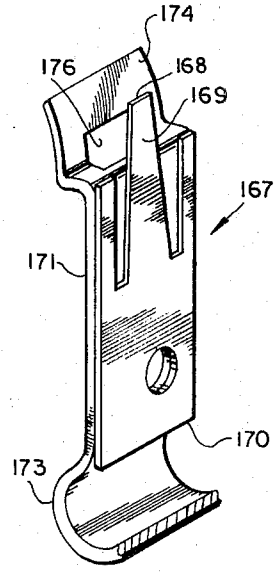


FIG 11

FIREARM APPARATUS

The present invention relates in general to firearm apparatus and in particular to a firearm having improved overall design and incorporating a number of improved subassemblies and components.

While the prior art of firearms includes examples of autoloading and semi-automatic firearms too numerous for specific mention, these firearms generally employ operating mechanisms including a substantial number of moving parts which have close tolerances and which, therefore, are expensive to manufacture. The mechanical complexity of such firearms inevitably results in a weapon in which the desired capability of semi-automatic or autoloading operation is obtained at the cost of increased weight, difficulty of cleaning and maintenance, and increased likelihood of malfunctioning, undesirable features of a firearm whether intended for use as a sporting arm or a combat weapon.

Accordingly, it is an object of the present invention to provide improved firearm apparatus.

It is another object of the present invention to provide improved autoloading firearm apparatus.

It is another object of the present invention to provide improved semi-automatic firearm apparatus.

It is still another object of the present invention to provide improved bolt assembly apparatus for use in a firearm.

It is yet another object of the present invention to provide improved firing pin and cartridge extractor apparatus for use with a firearm.

It is a further object of the present invention to provide improved firing mechanism for use with a firearm.

It is another object of the present invention to provide safety apparatus for use with a firearm.

It is another object of the present invention to provide sight apparatus for use with a firearm.

Other objects and many of the attendant advantages of the present invention will become apparent from the following description of a disclosed embodiment of the invention, including the following drawings, in which:

FIG. 1 shows a partially sectioned elevation view of a rifle according to a disclosed embodiment of the present invention;

FIG. 2 shows a plan view of the rifle shown in FIG. 1;

FIG. 3 shows an exploded view of the receiver assembly of the disclosed embodiment;

FIG. 4 shows an exploded view of the bolt assembly contained in the receiver assembly of FIG. 3;

FIG. 5 is a partial section view showing details of the firing mechanism, the safety, and other features of the disclosed embodiment;

FIG. 6 is a section view taken along line 6—6 of FIG. 1 and illustrating an interconnection between the halves of the stock according to the present embodiment;

FIG. 7 is a section view showing an alternative to the stock interconnection of FIG. 6 and including a loop for attaching a sling;

FIG. 8 is a section view taken along line 8—8 of FIG. 3, showing the internal arrangement of the bolt assembly;

FIG. 9 is a plan view showing a disclosed embodiment of the firing pin/extractor of the present invention;

FIG. 10 shows an exploded view of the rear sight according to the disclosed embodiment of the present invention; and

FIG. 11 shows a partial view of the front sight according to the disclosed embodiment of the present invention.

Stated in general terms, the firearm of the present invention includes an operating mechanism designed to be fabricated substantially or completely from stamped components which require only a minimal amount of precision machining operations. A receiver assembly is provided including a pair of parallel, spaced-apart plates within which is positioned the bolt assembly, which includes a bolt housing defining a channel for reciprocal movement of a bolt member disposed therein. A combination firing pin/extractor disposed on the bolt provides multiple functions associated with the firing of a round and subsequent extraction of the cartridge casing. Ejection of the cartridge is provided by an extension of a member forming the rear wall of the magazine housing. A firing mechanism is provided including a sear bar having separate fingers for trigger contact, hammer release, and hammer engagement to prevent hammer-followthrough action, and includes a safety actuating member mounted within the trigger guard. The trigger guard also forms part of the magazine housing and the cartridge loading ramp. A rear sight is provided including an adjustment feature, and a front fixed sight is provided to be capable of permanent adjustment.

Stated more particularly and with reference taken to the Figures, the disclosed embodiment of the present invention as particularly seen in FIGS. 1 and 2 includes a rifle indicated generally at 15 and of the type known as a carbine. The rifle 15 includes a stock 16 advantageously formed of two halves 17 and 18 which envelope most of the receiver and the barrel, as pointed out below. The halves 17 and 18 of the stock may be molded from a suitable plastic material having the desired resistance to physical stress and the like. The two halves of the stock 16 may be secured together at two or more locations, one of which is shown in FIG. 1 and is detailed in FIG. 6, including a pair of bosses 19 and 20 extending to provide the proper spacing between the two halves of the stock. A suitable fastening member such as the bolt 21 extends through aligned openings in the bosses 19 and 20. The opening through the boss 20 has a threaded portion 22 for engagement with the threaded portion 23 of the bolt 21, and has an unthreaded remainder portion 24 of sufficient diameter to permit free passage of the bolt threaded portion 23. The opening 25 extending through the boss 19 is threaded along a portion of its length. The presence of the unthreaded portion 24 enables the stock halves 17 and 18 to be separated by unscrewing the threaded portion 23 of the bolt from the corresponding threaded portion 22, thereby enabling the bolt to be removed from the threaded portion 22 of the opening while selectively retaining the bolt 21 in captivity on the stock half 18.

Although only a single stock connecting location is shown on the drawings, it will be understood that at least one other such connection is provided preferably at a location adjacent the front end 28 of the stock. If it is desired to equip the rifle 15 with a sling, the necessary sling connection may advantageously be provided as shown in FIG. 7, by removing each bolt 21 and sub-

stituting a swivel connector including a sling loop **29** mounted in a bushing **30** retained against the stock by a bolt **31** which differs from the bolt **21** primarily in the provision of an elongated shank **32.** In this way, a rifle according to the present invention can be normally furnished to all users having the stock interconnection as shown in FIG. **6,** and can be rapidly and inexpensively converted to receive a sling without required drilling and with only a conventional screwdriver.

Returning to FIG. **1,** the rifle **15** includes a receiver section shown generally at **34** and including a bolt member **35** positioned therein. The bolt member **35,** which includes a cocking member **36** extending outwardly of the receiver section and the stock **16,** is mounted for reciprocal movement by a first member such as the dowel pin **37** extending through a first slot **38** in the bolt member, and by a second member such as a second dowel pin **40** extending through a bolt bushing **39** slidably received within a second slot **41** of the bolt member. The bolt member **35** is normally maintained in the fully-forward position by an operating spring such as the compression coil spring **42** disposed in the second slot **41** to interact between the bolt bushing **39** and end of the slot.

The bolt member **35** includes a cartridge moving member **46** which extends downwardly from the remainder of the bolt member and on which is positioned the firing pin/extractor **47.** The construction and operation of the cartridge moving portion **46** and the firing pin/extractor **47** is discussed in detail below.

The rifle **15** includes a rifle barrel **48** having a cartridge-receiving chamber **49** positioned immediately adjacent the front face **50** of the cartridge moving member **46.**

It is particularly apparent in FIGS. **1** and **5** that the front face **50** includes a portion defining a surface **51** which is spaced forward a predetermined distance relative to the front face **50.** The normal position of the bolt member **35** in the full-forward position defined by engagement of the dowel pin **37** with the back end of the first slot **38,** under the influence of the spring **42,** is selected with reference to the positioning of the barrel **48** to provide a small amount of clearance at **53** between the surface **51** and the chamber end **52** of the barrel. It will be understood by those skilled in the art that the head spacing clearance **53** defined between the front face **50** of the cartridge moving member **46** and the chamber end **52** of the barrel must be suited to the rim of the particular cartridge for which the rifle is chambered. It will be seen that the disclosed embodiment of the present invention is chambered and otherwise designed for the .22 caliber rimfire cartridge.

The exploded view of FIG. **3** shows in detail the receiver section **34,** which includes a pair of spaced-apart receiver plates **55** and **56** which may be identical in configuration and which may be advantageously manufactured by a suitable stamping operation. The desired spacing between the receiver plates **55** and **56** is maintained by spacing elements **57** and **58,** by the trigger guard **59,** and by the barrel **48;** the spacing elements **57** and **58** are depicted as having tab-and-slot interconnection between the two receiver plates, and it will be understood that this interconnection may be supplemented or provided by permanent fastening techniques such as welding, riveting, or the like. The chamber end of the rifle barrel **48,** which may be secured between the receiver plates **55** and **56** by rivets **60***a*, **60***b*, **60***c*, and **60***d*, also functions to maintain the spacing between the receiver plates. The receiver plates **55** and **56** protrude upwardly from the stock **16** to form the ears **61** and **62,** and the spacing element **58** positioned between the ears also functions as a base for the rear sight, as set forth below.

BOLT ASSEMBLY

Positioned between the receiver plates **55** and **56** is the bolt assembly indicated generally at **65** in FIG. **3** and shown separately in exploded view in FIG. **4.** The bolt assembly **65** includes the bolt member **35** disposed within a bolt housing **66** which at least partially surrounds three sides of the bolt, as shown in FIG. **8,** and which may be fabricated by appropriate operations including stamping and bending. Each of the first and second dowel pins **37** and **40** extend from the respective slots of the bolt member and through corresponding pairs of openings **67** and **78** formed in the spaced-apart parallel walls **69** and **70** of the bolt housing. Each of the openings **67** and **68** is preferably dimensioned relative to the diameters of the corresponding dowel pins **37** and **40** to permit the dowel pins to provide a snug, noninterference fit, so that the dowel pins can be removed from the bolt assembly without requiring tools. As mentioned previously, the dowel pin **37** and the corresponding first slot **38** in the bolt member defines the maximum forward travel of the bolt member, and so the location in the bolt housing **66** of the opening pair **67** should be precisely defined with respect to the location of the rifle barrel.

The pairs of openings **67** and **68** in the bolt housing are provided on the interiors of the walls **69** and **70** with corresponding pairs of spacing elements which surround such openings. The spacing members surrounding the opening **67** are shown at **71***a* and **71***b* in FIG. **8,** and these spacing members may be provided by suitable expedients such as welding separate washer-like spacers in place, by dimpling the metal of the side wall **69** and **70,** or the like. It can be seen from FIG. **8** that the areas of the spacing members, including **71***a* and **71***b*, provide the only frictional contact with the bolt member **35.** The cocking member **36** extends upwardly through a slot **72** provided in the upper wall of the bolt housing **66.**

The operating spring **42** is captured in the slot **41** between the bolt bushing **39** and the end wall **73** of the slot. The diameter of the spring **42,** in the disclosed embodiment, is somewhat larger than the thickness of the bolt member **35,** so that the sides of the spring **42** make a loose sliding contact along approximately line areas of the interiors of the bolt housing side walls **69** and **70** during reciprocation of the bolt member. At the same time, reciprocation of the bolt member causes sliding contact of the operating spring **42** along another pair of approximately line contact areas where the individual coils of the operating spring contact the bottom wall **74** and the top wall **75** of the slot **41.** As a consequence, the movement of the operating spring **42** in compression and expansion during reciprocation of the bolt member is frictionally impeded only along the aforementioned four line contact surfaces. This reduction in the frictional force acting against both the operating spring **42** and the bolt member **35** results in a firearm having an operating action which is significantly faster than provided, for example, by actions in which the bolt slides along machined ways or in which the op-

erating spring is substantially enclosed within a tube or other member causing frictional contact around the periphery of the individual spring coils.

Referring again to the exploded view of FIG. 4, it will be seen that each of the dowel pins 37 and 40 is sufficiently long to extend out of the respective openings 67 and 68, and through the respective openings 77*a*, 77*b* and 78*a*, 78*b* to be retained in a pair of corresponding aligned openings (not shown) disposed in each of the stock halves 17 and 18. The dowel pin openings formed in the two receiver plates 55 and 56 are also dimensioned to permit a snug, non-interfering fit with the respective dowel pins, and it will be understood that the dowel pins 37 and 40 are retained in assembled positions by the aforementioned recesses within each of the stock halves. Thus, the bolt assembly 65 is readily removable from the rifle by separating the two stock halves and then simply manually withdrawing the dowel pins 37 and 40 from the two receiver plates, the bolt housing 66, and the bolt member 35, whereupon the bolt assembly is freed to be removed from the spaced-apart receiver plates.

The receiver plate 56, which is disposed on the right side of the rifle 15, includes an opening 83 which functions as an ejection port for spent cartridges. Since each of the receiver plates 55 and 56 can be identically configured for economy of manufacture, as mentioned above, the receiver plate 55 in the disclosed embodiment contains an opening 84 similar to the ejection port. While the opening 84 is useful to provide ventilation of gases from the chamber, it will be understood that the opening 84 is optional and is nonessential in a firearm designed to eject cartridges in the conventional or right-side manner.

FIRING PIN/EXTRACTOR MEMBER

The firing pin/extractor member 47 is provided by a flat stamping having a base portion 85 and a pair of generally parallel arms 86 and 87 extending outwardly from the base member, as best shown in FIGS. 4 and 9. The firing pin is provided for rimfire cartridges (in the disclosed embodiment) by the projection 88 adjacent the end of the arm 87, and it will be understood by those skilled in the art that the firing pin 88 would be appropriately repositioned for use in a rifle intended to receive center-fire cartridges. The arm 86 includes a right extractor lug 89 in opposition to and spaced a distance 90 beyond the firing pin 88. The left extractor is provided by the surface 91 which is disposed at the end of the arm 87 and which confronts the right extractor 89.

The arm 87 of the firing pin/extractor is mounted in a groove 92 contained along one side of the cartridge moving member 46, and the base member 85 is at least partially received within a slot 93 (FIG. 3) at the rear end of the cartridge moving member. A retaining lug 94 on the arm 86 is received in the aperture 95 of the cartridge moving member 96 to permit a limited extent of fore-aft movement of the firing pin/extractor member relative to the cartridge moving member. It will be appreciated that the relative dimensions of the retaining lug 94 and the aperture 95 are selected so that the firing pin 88 is behind the front face 50 when the firing pin/extractor is positioned rearwardly, and so that the firing pin 88 extends in front of the front face 50 when the firing pin/extractor is positioned forwardly of the cartridge moving member 46.

When a cartridge is positioned in the chamber 49 as described below, the head of the cartridge as shown in phantom in FIG. 9 is positioned between the left extractor 91 and the right extractor 89; the spring action provided by the length of the arm 87 enables the left extractor to maintain the cartridge head engaged behind the right extractor lug 89.

A rib 96 extending downwardly from the lower edge of the cartridge moving member 46 functions to move cartridges from a magazine to the chamber 49, as outlined below.

FIRING MECHANISM AND SAFETY

The firing mechanism assembly of the rifle 15 is best shown in FIG. 5, and the individual components of the firing mechanism are shown in the exploded view of FIG. 3. The firing mechanism includes the hammer 100 mounted for rotation on a pin 101 and biased by the spring 102 toward the position shown by the arrow in FIG. 5. The hammer is retained in the cocked position, shown in FIG. 5, by engagement of the sear notch 103 with the middle finger 104 of the sear bar 105. The sear bar additionally includes a rear finger 106 and a front finger 107, with all three fingers extending substantially transversely of the sear bar 105.

Each of the three sear bar fingers extends through a corresponding pair of slots 108, 109, and 110 formed in the receiver plates 55 and 56, with the sear bar fingers permitted a limited amount of fore-aft movement within such slots. The compression spring 111 acting against the middle finger 104 urges the sear bar 105 and all three fingers toward the rear position.

The middle finger 104 of the sear bar contains a pair of forwardly-facing notches 117 and 118 which retain the spring 111 in place against the middle fingers; the force of the spring 111 pressing into the notches 117 and 118 also serves to retain the sear bar 105 in the firing mechanism assembly.

The hammer 100 includes a holding surface 112 for selective engagement with the rear finger 106, and includes first and second camming surfaces 113 and 114 which enable the hammer to urge forward the spring-biased sear bar fingers 104 and 106 when the hammer is rotated in a counter-clockwise direction as explained below. The hammer 100 additionally includes a striking surface 116 for engaging the base member 85 of the firing pin/extractor member 47, and a holding surface 115 which is positioned to engage a noncritical surface of the middle finger 104 if the hammer is allowed to fall while the bolt assembly 65 is removed from the rifle.

The front finger 107 of the sear bar extends in front of the pushing surface 120 of a trigger 121 pivotally mounted as at 122. The trigger 121 includes a stop surface 123 which contacts a confronting portion of the trigger guard 59 to limit the forward motion of the trigger in response to the spring-biased rearward motion of the front finger 107. When the trigger 121 is pulled, the pushing surface 120 contacts the front finger 107 to move this finger, along with the other sear bar fingers 104 and 106, forward against the force of the spring 111. This forward movement causes the middle finger 104 to be removed from the sear notch 103, permitting the hammer 100 to be moved forwardly by the spring 102. This forward movement continues until the striking surface 116 strikes the base member 85 of the firing pin, causing the firing pin 88 to move forward and fire the round in the chamber. When the bolt member 35

is blown backwardly by the fired round, the bolt member moves the hammer **100** in a counter-clockwise direction until the middle finger **104** again engages the sear notch **103.** If the pulled trigger has not been released to permit the necessary rearward movement of the sear bar, however, the camming surface **114** of the hammer engages the rear finger **106** to move the sear bar in a rearward direction so that the finger **106** can engage the holding notch **112.** When the trigger **121** is finally releaased, the rear finger **106** is removed from the holding notch **112** and the hammer **100** falls forward to the position where the sear notch **103** engages the properly positioned middle finger **104.**

A safety apparatus for the disclosed rifle is provided by a safety lever **125** which is movable around a bushing **126** rotatably disposed on a pin **136** and loosely positioned to be biased toward one end of a slot **127** by the compression spring **128.** The safety lever **125** includes a stop notch **129,** which is movable to engage and block the bottom of the front finger **107** of the sear bar, and a stop surface **130,** which is shown contacting the top of the trigger guard **59.**

A safety apparatus additionally includes an actuating member **131** extending downwardly from the pivot bushing **126** through a slot **132** formed in the front of the trigger guard **59.** The actuating member **131** terminates in a pair of camming surfaces **133** and **134,** which selectively contact the lower end **135** of the trigger guard slot **132.**

In the operation of the safety apparatus, it will be seen that the actuating member **131** is normally biased downwardly to place one or the other of the camming surfaces **133** and **134** into contact with the lower end **135** of the trigger guard slot. Assuming that the actuating member **131** and the safety lever **125** are in the position shown in FIG. **5,** the sear finger **107** is free to be moved forwardly by the trigger **121** to release the hammer and fire the rifle. A rearward motion applied to the actuating member **131** causes the camming surface **133** to ride along the lower end **135** of the trigger guard slot, with the slot **127** being moved upwardly relative to the bushing **126** and the pin **136.** Continued rearward movement of the actuating member **131** causes the camming surface **134** to move onto the lower end **135,** at which time the actuating member **131** flips in toggle-action to move the stop notch **129** upwardly to engage and block forward movement of the front finger **107.** The safety apparatus thus remains engaged, preventing further firing of the rifle, until the actuating member **131** is again moved forwardly against the toggle action, as by forward movement of a person's finger inserted through the trigger guard **59.**

TRIGGER GUARD AND MAGAZINE HOUSING

A housing to receive and retain the cartridge magazine **139** is defined in part by a wall portion **140** formed as an integral extension of the trigger guard **59.** The wall portion **140** terminates at a ramp portion **141,** which is disposed forwardly to provide a surface directing a cartridge removed from the magazine for movement toward the chamber **49.** It is thus seen that the trigger guard **59** provides the functions of partially defining a magazine chamber, a cartridge feed ramp, a safety apparatus retainer, and a trigger positioning device, in addition to the conventional trigger-surround function.

The rear wall of the magazine chamber is formed by a flat metallic stamping **142** including a wall portion **143,** a deformed portion **144** which curves rearwardly to contact the interior surface **145** of the stock portion surrounding the magazine housing, a magazine contacting portion **146** including a catch surface **147,** and a thumbpiece **148** which extends rearwardly from the lower end of the stamping. The upper end of the stamping terminates in the ejector **149,** which is located immediately below the cartridge moving member **46** and to one side of the cartridge feed rib **96** thereon. The stamping **142** may be provided with plural tabs **150** which engage in a corresponding plurality of slots **151** formed in the two receiver plates **55** and **56.**

It can be particularly seen in FIG. **5** that a magazine **139** having a notch **152** on its rear side is retained in place by resilient movement of the catch surface **147** into the magazine notch.

OPERATION

Considering the operation of the firearm as described, it is assumed that a cartridge-containing magazine **139** is fully inserted into the magazine housing and that the chamber **49** is presently empty. When the bolt member **35** is moved back by manual movement of the cocking member **36,** the cartridge feed rib **96** becomes positioned behind the first cartridge in the magazine, and this rearward movement also moves the hammer **100** to the cocked position shown in FIG. **5.** When the cocking member **36** is released, the bolt member is moved forward by the operating spring **42** and the feed rib **96** strips the top cartridge from the magazine to move this cartridge along the ramp **141** and into the chamber **49.** During this forward movement of cartridge, the right and left extractors **89** and **91** become engaged with the rim of the cartridge. The firearm is now in condition for firing.

The firing mechanism operates as described above to strike the surface **116** of the hammer against the firing pin/extractor member, moving this member forward on the cartridge moving member **46** to the extent permitted by the free play of the retaining lug **94** within the aperture **95.** The resulting forward movement of the firing pin **88** discharges the round, and the bolt member **35** is moved backwardly. The spent cartridge is withdrawn from the chamber **49** by the backward movement of the extractors **89** and **91,** the resilient action of the left extractor **91** maintaining the cartridge rim in engagement behind the right extractor lug **89.** This backward movement of the spent cartridge continues until the underside of the cartridge is forced against the ejector **149,** as seen in FIGS. **5** and **8,** whereupon the cartridge is dislodged from the extractors and ejected out of the ejection port **83** in the receiver plate **56.** The rearward movement of the bolt member **35** continues until the hammer **100** is again cocked and the front end of the slot **38** contacts the dowel pin **37,** whereupon the operating spring **42** forces the bolt member forward and the loading cycle repeats.

FRONT AND REAR SIGHTS

The rear sight of the type providing a "click" elevation adjustment is provided, according to the present invention, as another function of the receiver plate spacing element **58.** The forward portion of the spacing element **58,** shown in detail in FIG. **10,** provides a ramp

156 disposed on a slope relative to the boresight of the rifle barrel 48, and an opening 157 is formed in the ramp. The actual rear sighting element, in the disclosed embodiment, is provided by the peep sight opening 158 mounted to extend upward from the sight slide 159. The sight slide 159 contains a plurality of contiguous overlapped openings 160, and the sight slide is attached to the ramp 156 with a fastener 161 having a conical surface 162. The shank of the fastener 161 passes freely through the openings 160 and the opening 157 in the ramp 156, and is retained with the conical surface 162 drawn into one of the openings 160 by the resilient force of a fastening member such as the retaining ring 163 having the shape of a conic section.

Movement of the sight slide 159 in either direction along the ramp 156 provides a number of click elevation adjustments for the sight opening 158 as the conical surface 162 moves between the adjacent ones of the openings 160. A rear sight is thus provided which affords click-elevation adjustment at relatively little additional cost and which also utilizes the spacing element 58, an integral part of the disclosed embodiment of the invention. The upper end of the receives plate ears 61 and 62 (FIG 2) shield and define the region in which the sight opening 158 moves.

Considering the front sight 167 as shown in FIGS. 1, 2, and 11, the actual visual sighting function is provided by the end 168 of a blade 169 which extends downwardly to a lower end 170 preferably secured premanently as by welding or the like to the exterior of the rifle barrel 48. The blade 169 is surrounded on the left and right sides by a pair of protective members 171 and 172, which may be fabricated from a single piece of metal to include a looped portion 173 disposed around and secured to the rifle barrel 48. Each of the protective members 171 and 172 terminates in a protective ear 174 and 175, respectively, with these ears being spaced apart from the sight end 168 to define and protect this sight.

The protective members 171 and 172 include adjustment openings, one of which is shown at 176, through which the blade 169 can be contacted with a suitable tool to be bent. It is contemplated that the front sight 167, once initially installed during the manufacture of the rifle, would be sighted-in by bending the blade 169 as necessary to achieve the proper horizontal location for the sight end 168. The protective members 171 and 172, including the ears 174 and 175, protect and substantially surround the blade 169 to protect this blade from becoming easily damaged or otherwise misaligned from any physical contact with the blade. Even if damage occurs in some manner, the blade 169 can again be bent to sight-in the rifle.

Although the foregoing disclosure of an embodiment of the present invention sets forth a complete firearm having numerous operating assemblies and features, it will be apparent to those skilled in the art that many of these features can be applied separately to firearms of different overall design without detracting from the operation and the advantages afforded by each particular assembly. For example, it will be understood that a firearm could be provided having a bolt assembly according to the present invention, without requiring a firing mechanism as disclosed herein. Similarly, a safety apparatus according to the present invention could be provided for many different types of firearms.

The overall firearm design of the present invention permits extensive use of components which can be manufactured by relatively inexpensive techniques such as stamping, bending, and the like, and which require little or no precision machining, apart from portions such as the bolt member and the dowel pins as aforementioned. A firearm thus can be provided according to the present invention which is inexpensive and light of weight, and which additionally provides a low-friction action which is rapid, dependable, and easily broken down for cleaning or other purposes. in the disclosed embodiment of the invention, for example, the complete action consists of four basic moving parts: the bolt member, the hammer, the sear bar, and the trigger.

Moreover, it will be apparent to those skilled in the art that only a preferred embodiment of the present invention is disclosed, and that numerous modifications and alterations may be made therein without departing from the spirit and scope of the invention as defined in the claims.

What is claimed is:

1. A bolt assembly for a firearm comprising:
a bolt housing defining an interior channel to receive a bolt member for reciprocal sliding movement therein;
a bolt member received in said channel;
means within said channel maintaining said bolt member in spaced apart relation with said channel;
at least one bolt member retaining means operatively interconnected between said bolt housing and said bolt member to define a predetermined extent of reciprocal sliding movement of said bolt member relative to said bolt housing;
a resilient member received within said interior channel of said bolt housing and operatively positioned to bias said bolt member in a first direction of said sliding movement;
said bolt housing including a pair of generally elongate wall members which are spaced apart to define said interior channel;
said means within said channel including means disposed within said interior channel in confronting relation on said wall members to define confronting spaced apart surfaces along which said bolt member moves for said sliding movement; and
said bolt member having spaced apart surfaces positioned for sliding contact with said spaced apart surfaces defined by said means disposed on said wall members.

2. The bolt assembly as in claim 1, further comprising:
an elongate aperture formed in said channel member; and
a cocking handle attached to said bolt member and disposed to extend outwardly of said elongate aperture in said channel member to permit said bolt member to be moved in a second direction of said sliding movement in opposition to the bias of said resilient member.

3. The bolt assembly as in claim 1, wherein:
said bolt member includes a cartridge movement portion;
firing pin means having a cartridge firing position and carried on said cartridge movement portion to be selectively movable to a first position whereat said

cartridge firing portion is extended to cartridge engaging position and to a second position whereat said cartridge firing portion is withdrawn from said cartridge engaging position.

4. The bolt assembly as in claim **3,** wherein:

said cartridge movement portion includes a downwardly extending portion of said bolt member and having a front face of vertical dimension at least as large as the rim diameter of a cartridge intended for use with said bolt assembly;

the vertical dimension of said front face being defined by a projection disposed on said bolt member above and extending a spaced distance in front of said front face.

5. A bolt assembly for a firearm, comprising:

a bolt housing defining an interior channel to receive a bolt member for reciprocal sliding movement therein;

a bolt member received in said channel;

at least one bolt member retaining means operatively interconnected between said bolt housing and said bolt member to define a predetermined extent of reciprocal sliding movement of said bolt member relative to said bolt housing;

a resilient member received within said interior channel of said bolt housing and operatively positioned to bias said bolt member in a first direction of said reciprocal movement;

said one bolt member retaining means including a first elongate slot in said bolt member, one end of said first elongate slot defining a movement stop of said first direction of reciprocal movement; and

a first stop member disposed in fixed relation with said bolt housing and extending in sliding fit in said first elongate slot, said one end of said elongate slot and said stop member being located relative to each other so that such movement stop of said bolt member in the first direction relative to said bolt housing is defined by contact of said first stop member and said one end of said first elongate slot.

6. The bolt assembly as in claim **5,** wherein:

the other end of said first elongate slot defines the movement stop of said bolt member in the second direction relative to said bolt housing.

7. The bolt assembly as in claim **6,** further comprising:

a second elongate slot in said bolt member;

a second stop member disposed in fixed relation with said bolt housing and extending in sliding fit in said second elongate aperture; and

said resilient member being disposed within said second elongate slot to exert bias between an end of said second elongate slot and said second stop member, so that said bolt member is biased in said first direction relative to said bolt housing.

8. The bolt assembly as in claim **7,** wherein:

said first elongate slot is of certain width in said bolt member;

said first stop member is recieved in said first slot and has a width relative to said certain width of said first slot to permit substantially only sliding movement of said slot relative to said first stop member;

said second elongate slot is of certain width in said bolt member to permit substantially only sliding movement in a first plane of said resilient member received within; and

said interior channel of said bolt housing has a channel width adjacent the path of reciprocal sliding movement of said second slot to permit substantially only sliding movement of said resilient member.

9. The bolt assembly as in claim **8,** further comprising:

spacing means disposed on said bolt housing within said interior channel thereof to define a bolt member passageway of width less than said channel width;

said resilient member being retained by said channel width for substantially only vertical movement in a second plane transverse to said first plane.

10. A bolt assembly for a firearm, comprising:

a bolt housing including a pair of side walls which are spaced apart to define a bolt receiving channel having length and having certain width;

a bolt member disposed in said channel for reciprocal movement in a direction along the length of said channel, the dimension of said bolt member in width being less than said channel width;

spacing means interpositioned between said bolt member and said side walls to position said bolt member for said reciprocal movement along said channel without contact between said side walls and said bolt member, said spacing means comprising at least one spacing member mounted on one of said pair of side walls in confronting sliding contact with a first location along said bolt member; and

at least one spacing member mounted on the other of said pair of side walls in confronting sliding contact with a second location along said bolt member.

11. A bolt assembly for a firearm, comprising:

a bolt housing including a pair of side walls which are spaced apart to define a bolt receiving channel having length and having certain width;

a bolt member disposed in said channel for reciprocal movement in a direction along the length of said channel, the dimension of said bolt member in width being less than said channel width;

spacing means interpositioned between said bolt member and said side walls to position said bolt member for said reciprocal movement along said channel without contact between said side walls and said bolt member;

an elongated slot formed in said bolt member in alignment with the direction of said reciprocal movement;

a pin member extending from said bolt housing and received in said elongate slot, said slot being slidably movable with respect to said pin member; and

at least one end of said slot being located on said bolt assembly in certain relation relative to said pin member to define a predetermined extent of said reciprocal movement in a selected direction of bolt movement.

12. The bolt assembly as in claim **11,** wherein said spacing means comprises:

a first spacing member surrounding said pin member between one of said pair of side walls and a confronting first location of sliding contact on said bolt member; and

a second spacing member surrounding said pin member between the other of said pair of side walls and a confronting second location of sliding contact on said bolt member.

13. The bolt assembly as in claim **11,** wherein said elongate slot is a first elongate slot and said pin member is a first pin member; and further comprising:

a second elongate slot formed in said bolt member in alignment with said direction of reciprocal movement; and

a second pin member extending from said bolt housing and received in said second elongate slot, said second slot being slidably movable with respect to said second pin memer.

14. The bolt assembly as in claim **13,** further comprising:

a compression coil spring received in one of said slots between the corresponding pin member and an end of said one slot;

the coil diameter of said spring being sufficiently greater than said width dimension of said bolt member so that a portion of said spring coils extend outward of said one slot to make loosely sliding contact with said side walls of said bolt housing, so that said spring is retained within said one slot by said side walls.

15. The bolt assembly as in claim **13,** wherein said spacing means comprises:

a first pair of spacing members surrounding said first pin member and respectively positioned between said pair of side walls and said bolt member; and

a second pair of spacing members surrounding said second pin member and respectively positioned between said pairs of side walls and said bolt member;

said first and second pair of spacing members being in sliding contact with said bolt member.

16. A bolt assembly for a firearm, comprising:

a bolt housing including a pair of side walls which are spaced apart to define a bolt receiving channel having length and having certain width;

a bolt member disposed in said channel for reciprocal movement in a direction along the length of said channel, the dimension of said bolt member in width being less than said channel width;

spacing means interpositioned between said bolt member and said side walls to position said bolt member for said reciprocal movement along said channel without contact between said side walls and said bolt member;

said side walls comprising parallel plane surfaces spaced apart from each other said certain width to define said bolt receiving channel;

said bolt member having a pair of parallel plane sides each of which is in confronting spaced apart relation with a corresponding one of said plane surfaces of said side walls; and

said spacing means are in sliding contact with said parallel sides of said bolt member to permit said reciprocal movement of said bolt member while maintaining said bolt member out of contact with said side wall.

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