Feb. 27, 1951 L. S. SINGER 2,543,604

BOLT ACTION FIREARM

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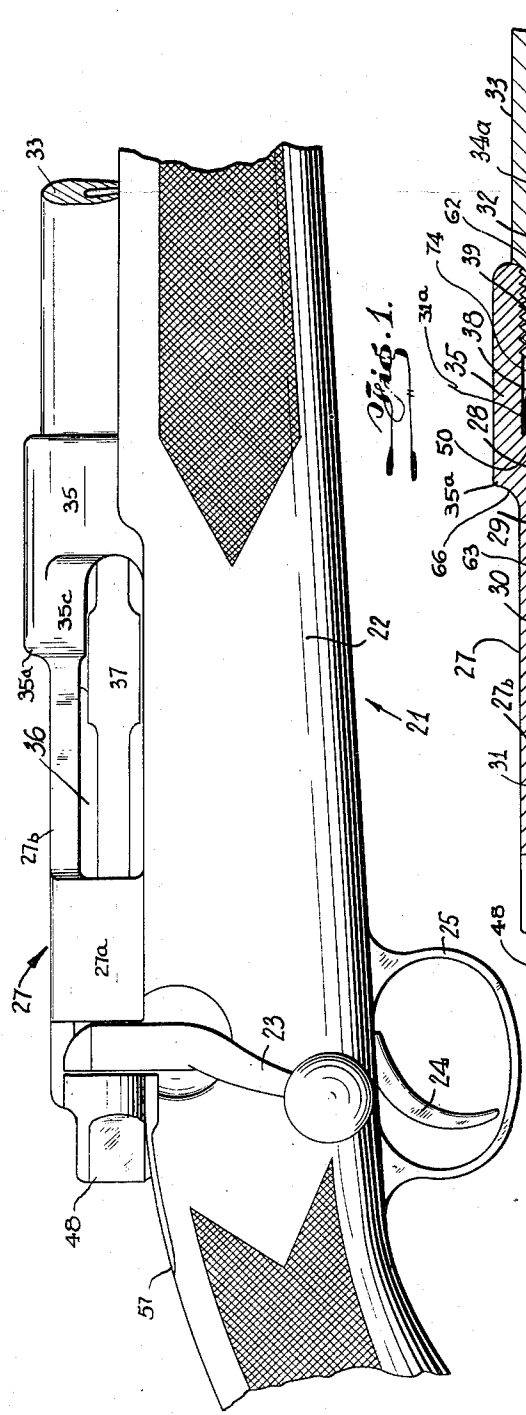


Fig. 1.

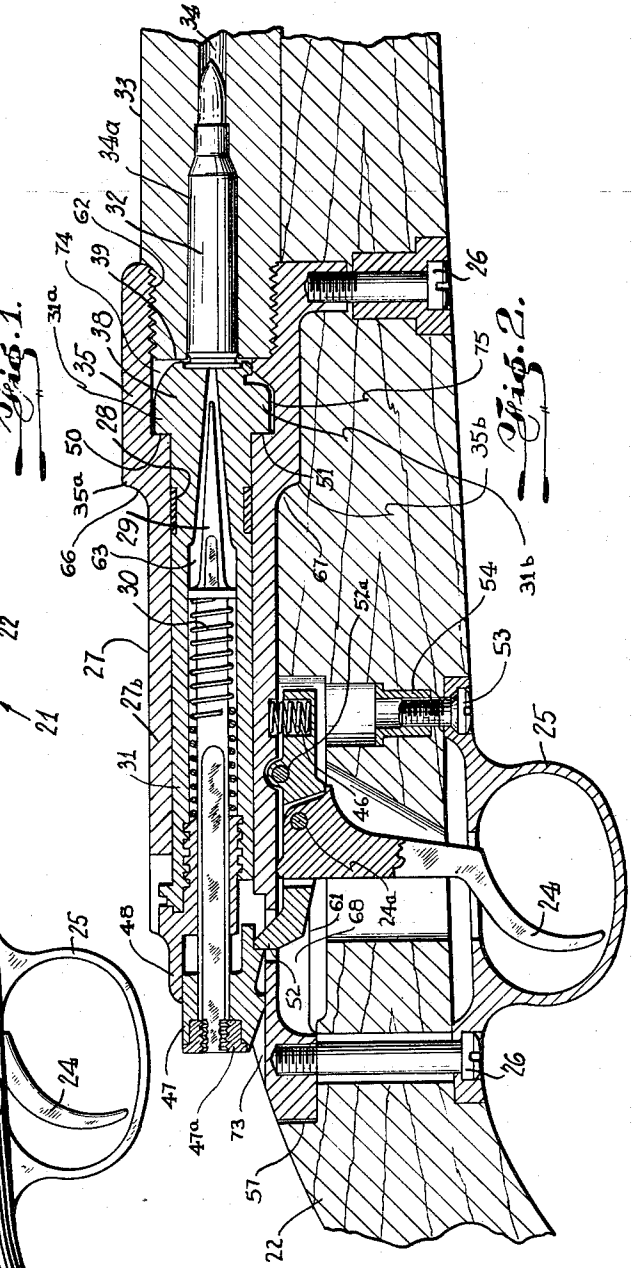


Fig. 2.

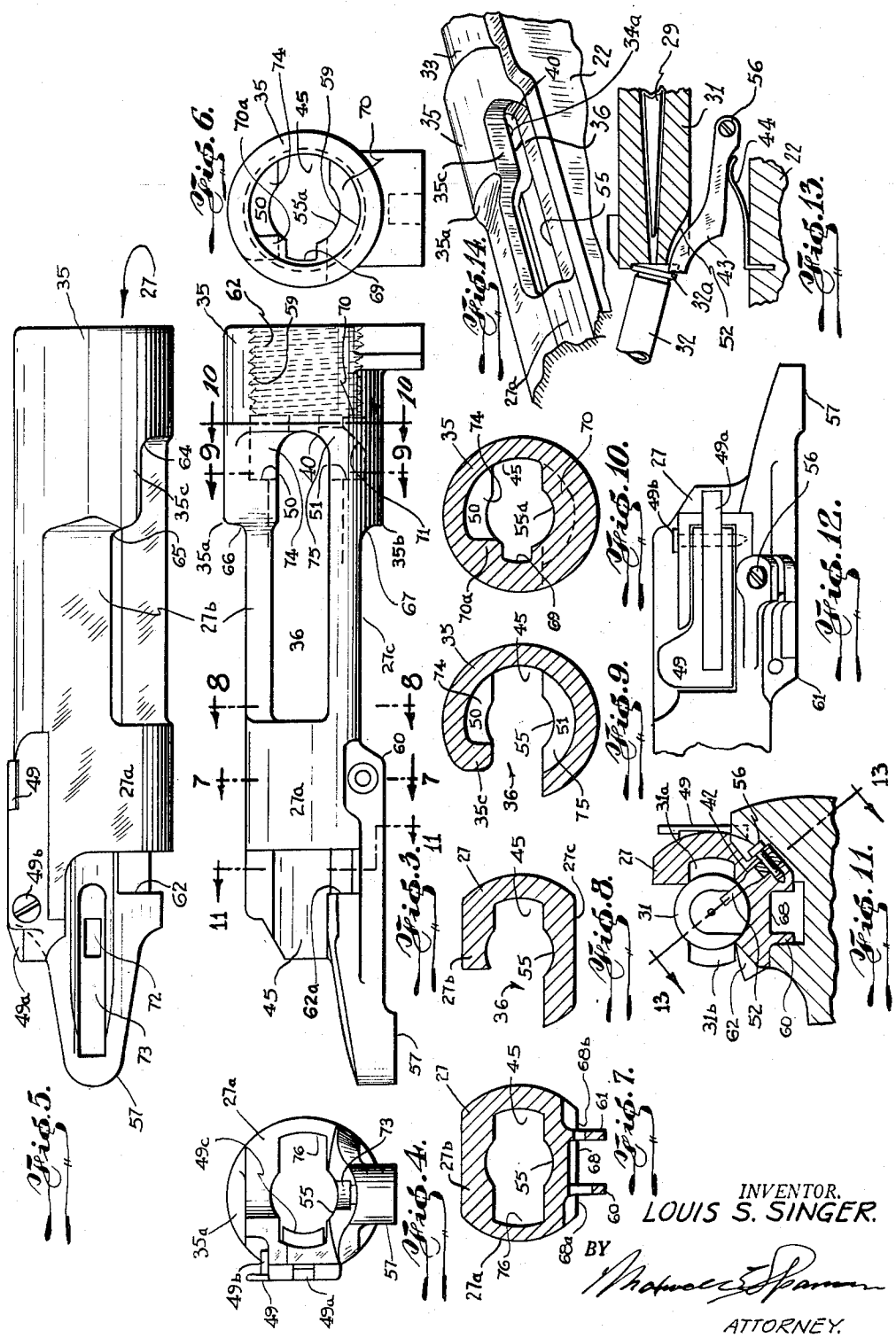
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BOLT ACTION FIREARM

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BOLT-ACTION FIREARM

Louis S. Singer, New York, N. Y.

Application March 29, 1947, Serial No. 738,150

1 Claim. (Cl. 42—16)

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This invention relates to bolt action firearms, incorporating a short breech bolt and a complementary short receiver constituting what is known as a short action, with specific improvements in the loading port and breech lock arrangement.

It is an object of this invention to provide a bolt action firearm with an improved loading port in the receiver, so constructed as to provide direct accessibility to the rifle chamber for simplified manual loading of the cartridge when the bolt is open and withdrawn to the limit of its rearward position.

A further object is to provide a single shot firearm with a short receiver and reciprocable bolt, locking at the head proper, and with a shallow seating in the receiver to effectively dissipate gas in event of case rupture during firing.

A further object is to provide a single shot firearm with an overall shorter and compacted action, suited for cartridges up to a length of 2½'' inclusive.

A further object is to provide an arrangement between the bolt, loading port and chamber, whereby, with the bolt in its rearmost position, the locking shoulders, recesses and chamber are directly exposed for cleaning purposes.

With these and other objects of the invention in view, the means for their attainment will be more apparent from the following description, taken in connection with the drawings, illustrating a representative embodiment of the invention, and will be hereinafter more fully described in the drawings, in which;

Fig. 1 is a fragmentary side elevation of the rifle embodying the invention;

Fig. 2 is a longitudinal cross-section of the rifle in cocked firing position, exposing the associated parts hidden in Fig. 1;

Fig. 3 is a side elevation of the receiver;

Fig. 4 is a left hand end view of the receiver;

Fig. 5 is a top plan view of the receiver;

Fig. 6 is a right hand end view of the receiver;

Figs. 7–10 inclusive are sectional views taken at corresponding lines in Fig. 3;

Fig. 11 is a sectional view taken along line 11—11 of Fig. 3 through the ejector mechanism, with the bolt shown retracted to rearmost position;

Fig. 12 is a fragmentary side view of Fig. 11 showing the bolt stop provision;

Fig. 13 is a longitudinal sectional view taken through line 13—13 of Fig. 11, showing the ejector mechanism with the bolt in rearmost position, illustrating the manner of cartridge ejection; and

Fig. 14 is a fragmentary perspective view of the receiver showing the loading and ejection port arrangement.

The firearm 21 illustrated in Figs. 1 and 2

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consists in the main parts of a stock 22, a barrel 33, a receiver 27, and a breech bolt 31, located in receiver 27. With the bolt open and retracted to its rearmost position, a cartridge may be inserted through the loading port 36 into the chamber 34a. When the bolt handle 23 is pushed forward and down, twin opposed locking lugs 31a and 31b, at the bolt head 38, engage and lock against the forward faced locking shoulders 50 and 51 in the receiver ring 35. The cartridge rim 32a is engaged by the extractor lip (conventional, not shown) at the forward end of the extractor 37, which is attached to the extractor collar 28. The bolt 31 is centrally bored at 63, and adapted to receive the firing pin 29 propelled forward by a mainspring 30, released by means of the trigger 24, pivotable on a trigger pin 24a. Ejector mechanism 42 is conventional, consisting of an ejector 43 pivotable on a pin 56, said ejector being urged upwardly into the central bore 55, through a suitable slot, by a flat spring 44, Fig. 13, and co-acts with a slot 52 in the bolt head 38, when the bolt is in its rearmost retracted position, dislodging the cartridge through the ejection port 36. The ejector spring 44 is staked in the stock 22, and is omitted from Figs. 11 and 12 for clarity.

The rearmost position of the bolt is limited by a lip 49c which is an integral part of the bolt stop 49, pivotable on a pin 49b. The lip 49c is urged sideways, into the groove 45, by a spring 49a, through a suitable aperture (not shown) in the receiver wall, and engages the rear face of the bolt lug 31a in its rearward movement.

The receiver 27, as shown in Figs. 3 and 5, comprises a main body of general semi-cylindrical exterior, having integral therewith a cylindrical forward end or receiver ring 35, slotted through its side by a loading and ejecting port 36 to be described. The receiver ring 35 has an enlarged bore 59, terminating rearwardly at a barrel abutment or shoulder 70, said bore 59 being internally threaded at 62, for installation of barrel 33. The receiver is constructed with a longitudinal central bore 55, forming locking shoulders 50 and 51 at its junction with the bolt lug recesses 74 and 75. Forwardly, the central bore 55 communicates with the enlarged bore 59. The left side of the receiver has an internal longitudinal groove 45, adapted to receive the bolt lug 31a, said groove communicating forwardly with the enlarged bore 59. An oppositely disposed longitudinal slot 76 through the bridge is adapted to receive the extractor 37 and bolt lug 31b.

The receiver ring 35 terminates rearwardly of the locking shoulders 50 and 51 in a receiver hood 35a and 35b, top and bottom respectively. According to my invention, the top portion of the receiver 27 is transversely cut away, forming a top wall 27b, the transverse cut communicating for-

wardly with the top portion of the receiver hood 35*a* in a transverse radial cut 66. The bottom mid-portion of the receiver is transversely cut away forming a bottom wall 27*c*, said cut communicating forwardly with the bottom portion of the receiver portion 35*b*, in a transverse radial cut 67, and terminating rearwardly at two vertical ribs 60 and 61, an integral part of the receiver. Rearwardly the transverse cut communicates with a longitudinal slot 68 between said ribs 60 and 61 and the grooves 68*a* and 68*b* which occupy oppositely disposed positions, on the bottom of the receiver; said ribs, slot and grooves terminating rearwardly at the tang 57. The trigger mechanism, which is conventional, is supported between the ribs 60 and 61 on a pivot pin 52*a* and consists of trigger 24, sear 52 and the sear spring 46.

The receiver is provided with a longitudinally extending and substantially rectangular loading and ejection port 36, intermediately positioned on the right hand side of the receiver, the median axis of said port passing through the receiver axis at about 90° from vertical, and said port cuts away a section of wall, common to receiver body 27 receiver hood 35*a* and receiver ring 35, to be later described.

The forward edge 40 of the loading port 36 is semicircular in form, and positioned slightly rearward of the barrel face 39, forward of the locking shoulders 50 and 51, said port terminating rearwardly at the bridge 27*a*. The loading and ejection port 36 is laterally slotted through the side of the receiver body, the slot communicating with the central bore 55. The forward portion of the port 36 cuts away a portion of the receiver ring and receiver hood, said lateral slot communicating with the lug recesses 74 and 75 exposing and making accessible the chamber 34*a* for manual loading, when the bolt is retracted to its rearmost position.

A top right hand side portion of the receiver ring and receiver hood 35*a* is vertically cut away and communicates downwardly with the port 36, providing further clearance and accessibility in manually loading the chamber. The vertical cut, forms a sidewall 35*c* extending longitudinally and terminates forwardly, at the forward edge 40 of the loading port, in a radial vertical cut 64. The sidewall forms an integral angular construction with the receiver ring, as shown in Fig. 9, and rearwardly terminates at the receiver hood 35*a*. The top portion of the receiver wall 27*b* is vertically cut away and communicates downwardly with the port 36 to provide ample clearance for shell ejection, the vertical cut extending longitudinally, terminating forwardly with the receiver hood 35*a* in a vertical radial cut 65 and terminating rearwardly at the bridge 27*a*.

The rearmost position of the barrel face 39 is limited by an abutment or shoulder 70 forming an integral part of the receiver ring 35 therein, extending from the inner bottom portion of the receiver ring and terminating at its junction with the inner face of the sidewall 35*c*.

A groove 69 is cut longitudinally through the shoulder 70, to receive the extractor lip, said groove communicating rearwardly with the forward edge 40 of the loading port. It is to be noted in Fig. 9 that the upper portion of the abutment 70*a*, adjacent to the upper bolt lug recess 74, communicates rearwardly with sidewall 35*c*, forming an integral construction therewith.

The top surface 55*a* of the shoulder is arcuate

and, besides coinciding with the periphery of the central bore 55, is adapted to receive the bolt head 38 in closed position. The rear face 71 of the abutment 70*a* is of tapered arcuate construction and communicates rearwardly with the bolt lug recess 75, said face terminating circumference-wise at the forward bottom edge of the loading port. The upper and lower bolt lug recesses 74 and 75, respectively, within the receiver ring which are adapted to receive the bolt lugs, comprise an interior arc or partial bore of the same diameter as that of the enlarged bore 59 and extend through about three quarters of a circumference, communicating with the forward portion of the loading port slot, the interior arc terminating at its junction with the inner face of the sidewall 35*c*. The interior arc defining the lower bolt recess 75 communicates forwardly with the rear face 71 of the shoulder 70, and the interior arc defining the the upper bolt recess 74 communicates forwardly with the enlarged bore 59.

All conventional type firearms, such as the U. S. Springfield 1906 and the Mauser 98, employing a reciprocable breech bolt with twin opposed locking lugs at the bolt head, lock against locking shoulders, in a manner similar to that shown in Fig. 2. Heretofore, the conventional receiver construction employed an unslotted, fully cylindrical construction extending from the forward end of the receiver ring rearwardly to and including the receiver hood. In previous high-power bolt action, the top and central side portion of the receiver wall, between the bridge and receiver hood, is cut away by a median loading and ejection port, exposing the central bore to permit loading of ammunition into a magazine when the bolt is withdrawn to its rearmost position. The corresponding center bottom portion of the receiver wall is cut through into the central bore, and is adapted to receive the magazine.

In conventional receivers, when the bolt is in closed position, the bolt head is completely enclosed and deeply seated within the receiver ring. This deep seating creates a gap or dead-space condition, defined as the distance a cartridge must travel from the loading port edge to the chamber. In conventional firearms, it represents the distance from the edge of the receiver hood, through the central bore, past the locking lug recesses to the chamber, and is approximately one inch. When the bolt is retracted to its rearmost position, and it is desired to manually load a cartridge, accessibility to the chamber is possible only through the central bore and is limited by the receiver hood, as well as the wall of the receiver ring, which obstructs the thumb or fore-finger from fully seating the cartridge all the way in the chamber, without having to resort to closing the bolt in order to seat the cartridge. Where the firearm is chambered for an overall short lengthened cartridge, a tendency arises to "peer" under the receiver hood, to visually guide the bullet to the chamber, and to further prevent the bullet nose from battering against the barrel face, which occupies a deep recessed position within the receiver ring. The difficulty encountered in manual loading in the conventional type bolt action is overcome by the invention described in the following manner; the right hand side of the receiver ring as well as a portion of the receiver hood are cut away by the forward positioning of the loading port 36, which exposes the bolt lug recesses, locking shoulders and the chamber. With the bolt open and retracted to

its rearmost position, the chamber is exposed and accessible through the loading port, enabling a cartridge to be inserted and fully seated in the chamber by hand, without having to resort to close the bolt in order to seat the cartridge. A cartridge manually loaded or inserted all the way into the chamber by hand is to an advantage and desirable where accuracy is paramount, and the battering effect of magazine feed on the bullet nose may be detrimental to highest accuracy. The gap or "dead space condition" is greatly eliminated.

The shallow seating of the bolt head in closed position is advantageous in the event of cartridge case rupture during firing, permitting gas to escape more freely, through the extractor groove, and out the loading port, than does a deep seating bolt. There is also accessibility to the locking shoulders, lug recesses and barrel face for cleaning, when the bolt is open. In a critical analysis of breech locking arrangement, it can be noted in Figs. 2 and 3 that the lower bolt lug is fully supported by the locking shoulder **51**, as there are no cutouts behind said locking shoulder for magazine provision. The upper locking shoulder is reinforced by the side wall **35***c* and the top wall **27***b*, which forms a continuous bridge construction, integral with the receiver body. Impact and firing loads imposed on the locking shouders are internally distributed and dissipated through the receiver ring and receiver body, rather than dissipating totally within the receiver ring as in previous constructions. With the "dead space condition" and the overall length of the loading slot shortened suitably for small-sized cartridges, the overall arrangement of the rifle is shortened and compacted, eliminating to a great extent the ungainliness of a long stroke action.

Other features of this modified receiver do not constitute a part of this invention, being conventional, and do not require further description other than to point out that the portion of the receiver rearward of the bridge is constructed and adapted to receive the bolt plug **48** which is attached to the rear end of the bolt **31** by external threads mating with internal threads within the bolt bore **63**. Directly rearward of the bridge may be formed the bolt handle receiving slot **62***a*, adapted to receive the hub of the bolt handle **23**, and a longitudinal groove **73** adapted to accept the toe of the firing pin-nut **47**. Rearwardly, the receiver terminates in the tang **57**. A sear slot **72** is provided through the bottom of the receiver, to receive the lip of the sear **52**. The trigger guard **25** is secured to the stock by screw **53** engaging a threaded bushing **54**, and by a stock bolt **26** to the tang **57**. The two stock bolts **26** serve to secure the receiver to the stock.

By this particular construction, there has been disclosed herein a firearm which is compacted, easier to load manually, with an effective breech locking arrangement. It is not to be considered that this invention limits itself to the specific construction described and illustrated, but it extends to all equivalent construction, falling within the scope of the appended claim, which is broadly construed.

Having described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

In a bolt action firearm, in combination, a barrel, a receiver secured to said barrel, and a breech bolt reciprocable in said receiver between a normal and a retracted position, said breech bolt having a pair of opposite lugs at its forward end, said barrel forming an abutment for said forward end when the bolt is in its normal position, said receiver being formed with a central bore for said bolt and with lateral internal recesses for said lugs, respectively, said central bore terminating at the forward end in a widened portion forming shoulders against which said lugs after rotation in said widened portion abut to prevent the retraction of the bolt, said receiver being formed with a longitudinal loading slot for placing a cartridge in the rear end of said barrel, said slot communicating with one of said lateral recesses and extending forwardly for a sufficient distance to overlie one of the spaces formed between said two lugs after rotation of said bolt, said receiver being provided with a sidewall extending beyond the said shoulders and forming one of the walls of said one lateral recess, said sidewall preventing rotation of the bolt in one sense when the bolt has been advanced into its normal position, said sidewall being cut away adjacent the major portion of said slot.

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