Dec. 19, 1961 R. E. WEATHERBY 3,013,355

FIREARM BREECH BOLT MECHANISM WITH A BOLT STOP

Filed Feb. 11, 1959 2 Sheets-Sheet 1

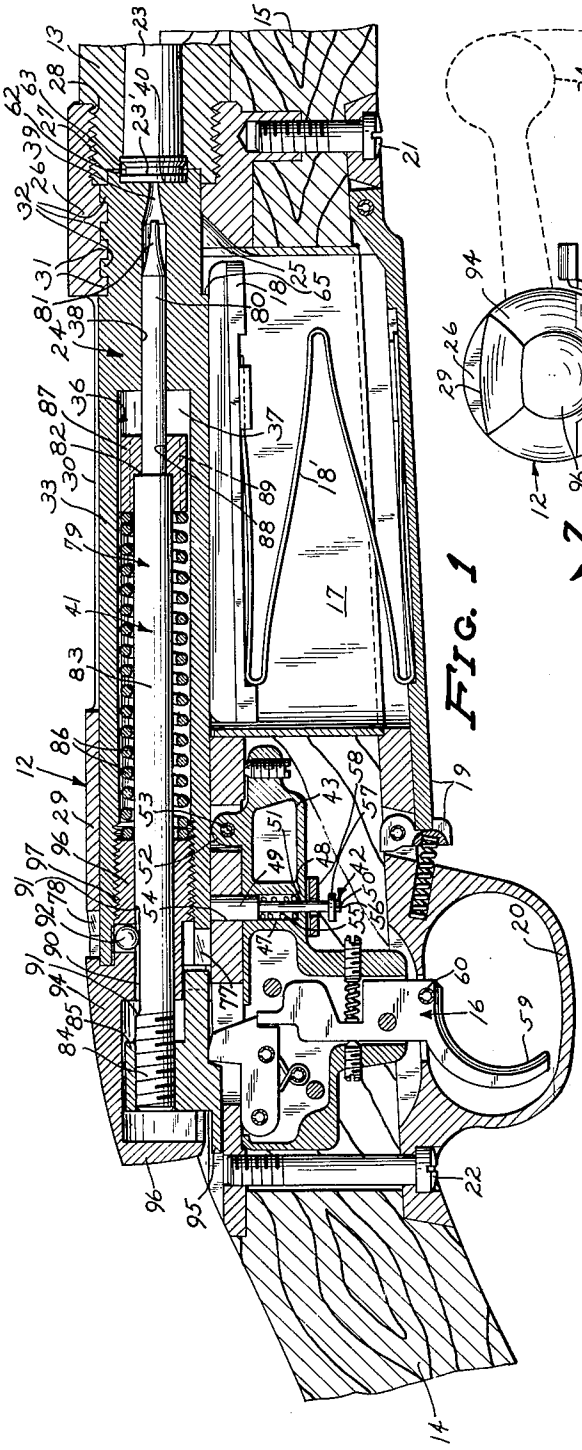


FIG. 1

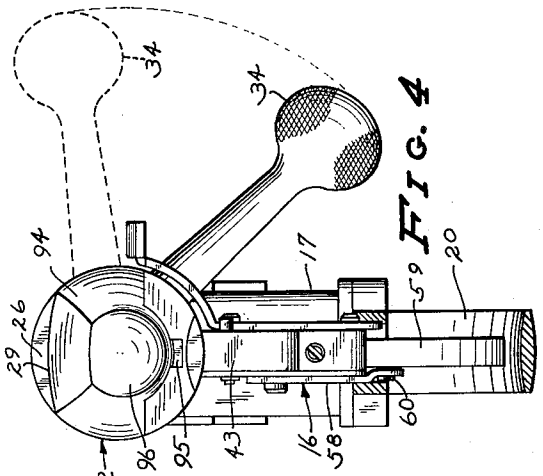


FIG. 4

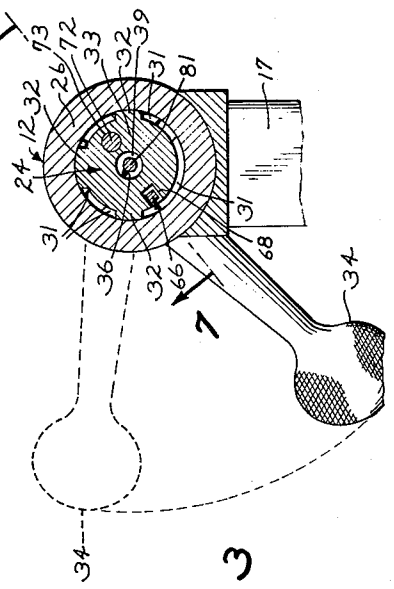


FIG. 3

INVENTOR.
ROY E. WEATHERBY
BY Daniel K. Kilgore
ATTORNEY

Dec. 19, 1961 R. E. WEATHERBY 3,013,355

FIREARM BREECH BOLT MECHANISM WITH A BOLT STOP

Filed Feb. 11, 1959 2 Sheets-Sheet 2

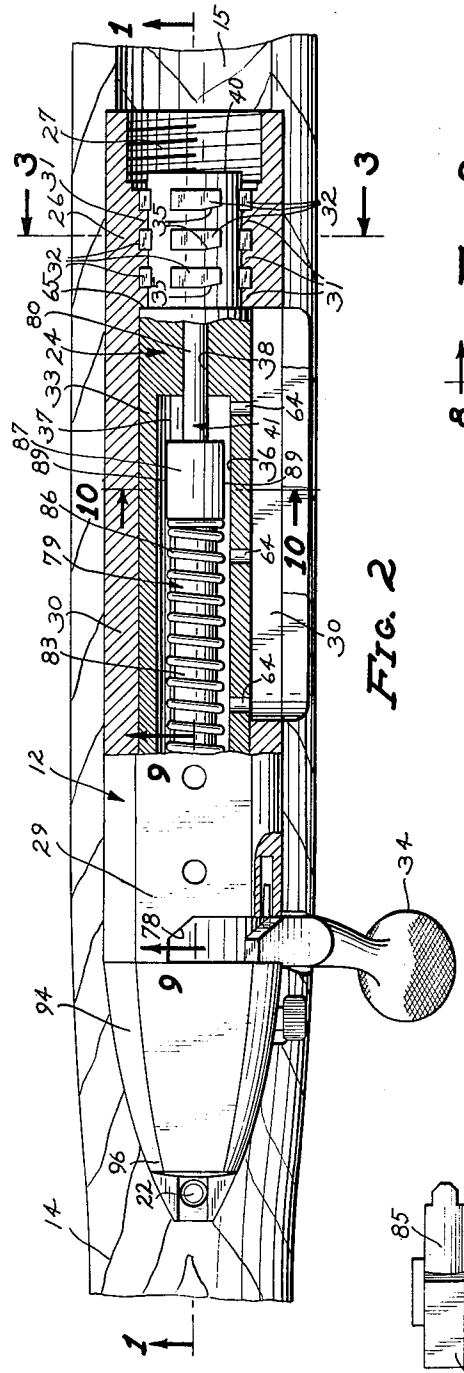


FIG. 2

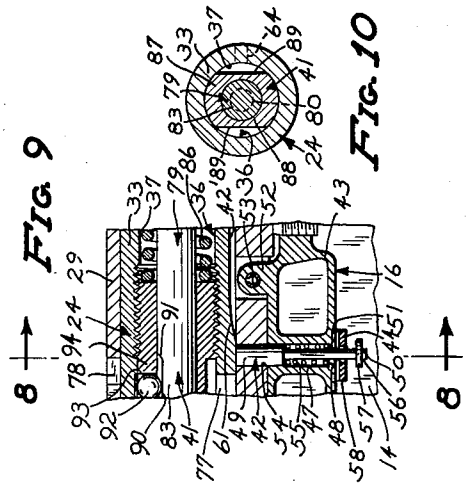


FIG. 9

FIG. 10

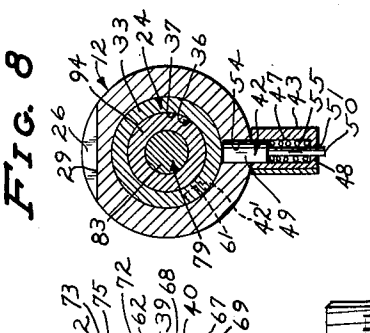


FIG. 8

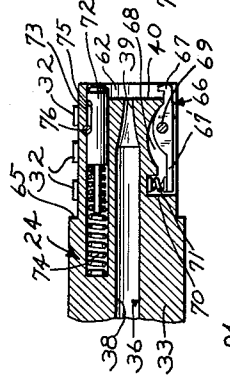


FIG. 7

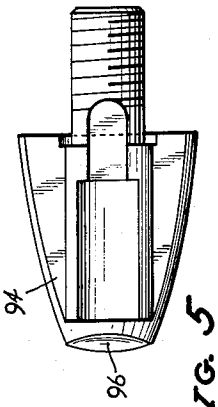


FIG. 5

FIG. 6

INVENTOR.
ROY E. WEATHERBY
BY David K. Wilson
ATTORNEY

United States Patent Office 3,013,355
Patented Dec. 19, 1961

3,013,355

FIREARM BREECH BOLT MECHANISM WITH A BOLT STOP

Roy E. Weatherby, 2781 Firestone Blvd., South Gate, Calif.

Filed Feb. 11, 1959, Ser. No. 792,519
7 Claims. (Cl. 42—16)

This invention relates broadly to an improved breech mechanism for firearms; more particularly to such a mechanism of the breech loading repeating bolt action type wherein the firing pin is contained within the bolt proper. More specifically, the instant invention relates to a breech mechanism of the type described, engineered and designed to provide maximum strength and safety with symmetry of design and appearance achieved by means of an improved locking principle of the bolt and the complete enclosure of a cartridge chambered in said breech mechanism and component rifle parts for firing.

It will therefore be understood that the principal object of this invention is to provide a breech action for firearms particularly for weapons of the shoulder type of improved design and construction and having maximum strength and safety factors embodied therein that are far in excess of normal maximum requirements.

A further object of this invention is to provide an improved breech mechanism for firearms that is by far the strongest action extant today wherein full regard is had for present day manufacturing processes and materials.

A further object of this invention is to provide an improved breech mechanism for firearms embodying an entirely new principle of locking the bolt on a chambered cartridge, and the complete enclosure of the chambered cartridge affording novel means to restrict the accidental flowback of gases from a detonated cartridge through the action and into the face of the shooter, said flowback of gases being the result of a leaky or pierced primer, cartridge core rupture caused from a poor case, barrel obstruction, over pressure from above maximum loadings, and the like.

A still further object of this invention is to provide an entirely new and improved breech action for firearms specifically designed and engineered to safely and properly handle the modern high intensity cartridge and which action is not merely, what has heretofore been referred to as a standard length breech action, "opened up," and modified, to accept the magnum type cartridge, often at the expense of sacrificing the all important safety factor. It will be understood, however, that the present invention is not necessarily intended for use exclusively with magnum length cartridges but is equally well adapted for cartridges of standard length.

As stated, an additional object of the invention includes a new and improved method and means for locking and breeching impart the additional strength and safety factors to this rifle action.

With reference to the improved locking system, there are provided in the instant action, nine locking lugs instead of the conventional two lugs customarily found in breech actions of this type. While these nine locking lugs are not as large individually, in shearing area as the conventional two lugs are individually; however, the total shear area of the said nine locking lugs is twice that of the said conventional two lugs of other bolt action type breech mechanisms.

It is well known that the weakest part of any rifle or rifle action is the cartridge case brass that is dimensioned and loaded to be fired in said rifle or action. In all present day rifles, there is a portion at the rear of said cartridge case that is not supported or protected by the barrel or the bolt of the said rifle. In the instant invention this inherent fault is overcome by the improved method of

breeching as will become apparent in the following specification and claims. In the present case the bolt face is actually counter-bored to receive and totally enclose the head of the cartridge case. It will be further noted that the breech end portion of the barrel is counter-bored to also receive and totally enclose that portion of the bolt which is housing the cartridge case head thus affording complete enclosure of the cartridge case within the bolt and barrel, the latter of which are similarly confined within an extremely strong receiver ring.

To substantiate the foregoing facts, the instant action which is the subject of this application, has been proof-tested many times, using ammunition dangerously loaded to develop breech pressures far in excess of twice that of normally loaded ammunition which maximum pressures are substantially 55,000 p.s.i. Such tremendous breech pressures would have blown apart portions of conventional receivers and actions, however, it has been found that the subject action held perfectly, even to the extent that detonated cartridge cases could easily be extracted by hand, creating no set back of head space between the bolt face and the cartridge head; and not even allowing case expansion to such a degree that the same could not be easily reloaded and refired.

A further object is the safety factor incorporated in the present breech mechanism consisting in the control of the flowback of gases from a detonated cartridge in the event of a pierced cartridge or any similar occurrence. Any of such gases that might conceivably flow rearwardly out of such cartridge case would naturally follow the path of least resistance, which would be via the extractor and the firing pin hole in the bolt face. Gases escaping around the extractor as described, would in the subject invention, be deflected by a substantial shoulder located immediately behind the locking lugs on the bolt and be directed outwardly and away from the face of the shooter. The gases that would flow into the firing pin hole would flow back into the bolt and be released to atmosphere via three gas escape ports located on the longitudinal side portion of the bolt. Escape gases that might continue to flow back through the bolt sleeve and around the cocking piece would be deflected downwardly, away from the face of the shooter, by means of a novel bolt sleeve, all of which will presently be described in detail.

A still further improvement in the present invention over conventional prototype actions is the arrangement of the three sets of locking lugs on the bolt which allows for the cocking and extraction thereof with only a 54° upright of the bolt, wherein conventional actions, with only two locking lugs, require that the bolt must be rotated axially a full 90° to accomplish the same purpose. This short upstroke of the bolt, in addition to the hardening and polishing of the cocking cams affords extremely smooth bolt operation, thus permitting fast extraction and reloading of a cartridge into the chamber which is highly important.

A still further object of the invention becomes apparent in that it is a well known fact in the shooting fraternity that a conventional bolt action rifle is characteristically loose and sloppy in operation because of the fact that the bolt itself is necessarily of lesser diameter than the inside diameter of its receiver due to the extractor mechanism. For instance, with the bolt in its most rearwardly position, the excessive play and looseness tends to bind the bolt on the internal walls of the receiver thus preventing the same from being pushed forwardly unless such movement is in a direct line relative to the receiver. The present invention, by virtue of its design, permits the use of manufacturing procedures of embodying precise tolerances to eliminate this looseness and provides for extremely smooth and fast bolt operation. The locking lugs being of the same diameter as the bolt proper makes it

possible to turn the bolt within very close tolerances to the inside diameter of the receiver in which the bolt works, since the extractor is in flush arrangement with the bolt itself as will also presently be described.

A still further object of the invention is to provide novel visual means in combination with the cocking piece of the action which affords indicator to show that the action is cocked.

The subject action also presents a modern and streamlined appearance with all working components, i.e, safety, bolt release, and etc., confined within the action and trigger assembly and further embodies a conventional staggered magazine having a hinged floor plate providing for the easy removal of loaded rounds of ammunition in said magazine.

These and other objects of the invention will become apparent from the following specification and claims, taken in conjunction with the appended drawings which form a part of this application and in which like characters indicate like parts throughout the several views.

To the above end, generally stated, the invention consists of the following devices and combinations of devices hereinafter described, and defined in the claims.

Referring to the drawings:

FIG. 1 is a right hand side elevational view of the invention in longitudinal section, fragmentarily showing a portion of a rifle stock, and the barrel, taken along the line 1—1 of FIG. 2;

FIG. 2 is a top plan view of the invention, some parts being broken away and sectioned to illustrate the locking lugs;

FIG. 3 is a fragmentary end elevational view of the bolt, some parts thereof being sectioned, taken along the line 3—3 of FIG. 2, the raised position of the bolt being shown by means of broken lines;

FIG. 4 is a rear elevational view of the invention also showing the raised position of the bolt by means of broken lines;

FIG. 5 is a bottom plan view of the bolt sleeve;

FIG. 6 is a bottom plan view of the cocking piece;

FIG. 7 is a fragmentary view of the bolt in section taken on the line 7—7 of FIG. 3;

FIG. 8 is an end elevational view of the bolt receiver section taken on the line 8—8 of FIG. 9;

FIG. 9 is a fragmentary side elevational sectional view taken on the line 9—9 of FIG. 2, and;

FIG. 10 is an end elevational view taken on the line 10—10 of FIG. 2.

The numeral 12 is directed to the receiver section of a shoulder type firearm having a barrel 13, a unitary butt stock and fore end 14 and 15 respectively, all of which are fragmentarily shown in the drawing. A trigger assembly, identified as an entirety in this application by the numeral 16 is as stated, the subject matter of a co-pending application and will not be further dealt with herein in detail except as it may become necessary to make reference to certain parts thereof.

While no inventive concept resides therein, it is important to further note the magazine box 17; the magazine follower 18; and follower spring 18'; the hinged magazine floor plate and catch assembly therefor 19; and the trigger guard 20.

The magazine floor plate and catch assembly, together with the cooperating trigger guard are held rigidly positioned relative to the receiver section 12, and the butt-stock and fore end 14 and 15 respectively by front and rear guard screws 21 and 22 respectively. A cartridge 23, is fragmentarily shown chambered in the breech of the barrel 13.

It will be understood that to charge the magazine loaded cartridges 23, are fed through the receiver section 12 which exposes the cartridge follower 18 when the bolt 24 is withdrawn into its most rearwardly position. Said cartridges are fed into the magazine box 17, by depressing a cartridge 23, not shown, which has been positioned on the follower 18 until it is secured underneath the side rail, not shown, on the right hand side of the receiver 12. A second cartridge 23, over the first noted cartridge, not shown, is then inserted in the same manner and engages the side rail, not shown, on the left hand side of the receiver, and a third cartridge, not shown, is then inserted and held positioned in a manner identical with that of the first noted cartridge, to thus fill the magazine box 17 with loaded ammunition in staggered vertical arrangement and held so positioned by the said receiver rails, not shown, and the tension of the magazine follower spring 18'. As shown on the drawing, the chambered cartridge is positioned for firing but it will be understood that the bolt 24 must be first cocked by actuating the bolt handle. The foregoing is conventional and is described briefly only in this application to establish the repeating function of the firearm referred to herein.

To continue the firing cycle, after the chambered cartridge 23 has been fired, the bolt mechanism 24 is actuated to extract the fired case during the rearward, opening, movement of said bolt. The uppermost cartridge in the magazine box is engaged by the bolt 24 and as the same is moved forwardly, the lower portion of the bolt has abutting engagement with the upper portion of the case head to thus move the cartridge forward out of engagement with the receiver rails and the magazine follower, and as the forward movement of the bolt continues the cartridge bullet, not shown, engages a feed ramp in the receiver, which is in direct communication with the chamber, to thus guide the unfired cartridge into the chamber in the barrel 13. Closing and locking the bolt 24 completely chambers the cartridge, engages the extractor mechanism with the rim of the cartridge case head, and moves the firing mechanism into engagement with the trigger mechanism all of which will be presently described in detail.

The foregoing firing cycle is also to be considered as conventional and is described only in a broad sense to lay a basis for the particulars of the invention involved, and as will hereinafter be described and defined in detail.

Referring now in detail to the inventive concept involved in the mechanism thus far broadly described, the numeral 12 will continue to identify the receiver of a firearm section as an entirety, the same being true of the bolt mechanism as an entirety, which will continue to be identified by the numeral 24, and the barrel 13, fragmentarily shown.

Of the several components which comprise the integral receiver as an entirety, it is, for the purpose of this application, important to note the receiver ring 26 with which the barrel 13 has screw threaded engagement, said receiver ring being internally threaded at its forward end portion 27 to receive external threads 28 on the breech end portion of the barrel. It is further important to note the receiver bridge 29, and the longitudinally disposed receiver rails 30 integrally connecting the receiver ring and the receiver bridge 26 and 29 respectively.

Formed internally in the central and rear end portion of the receiver ring 26 are a plurality of nine receiving lugs 31 that mate, and are in register with, a plurality of nine locking lugs 32 when the bolt mechanism is closed for firing as will presently be described. The 9 receiving lugs 31 are formed in groups of 3, each lug 31 of each of said groups being longitudinally spaced the one from the other, said groups being circumferentially disposed and machined integral with, the central and rear internal surfaces of the receiver ring 26.

The numeral 24 has been directed herein to the bolt assembly as an entirety but said bolt comprises a number of components, namely, the cylindrical, breech bolt proper 33, having an integral bolt operating handle 34 rigidly secured to the rear end portion of said bolt. A plurality of 9 locking lugs 32 are machined into the forward end portion of the breech bolt 33, said lugs being

positioned on the bolt to engage the cooperating receiving lugs 31 in the receiver ring 26 when said bolt 33 is closed and axially rotated. Cam surfaces 35 on the locking lugs 32 facilitate smooth initial movement or engagement of the locking lugs with the said receiving lugs 31. This system of locking the closed bolt is a highly regarded improvement over systems embodying the conventional two locking lugs and cooperating receiving lugs, for the reason that far greater strength is achieved by the arrangement herein described. As previously stated while the nine locking lugs 32 are not as large in shearing area individually, as are the conventional two lugs, individually; the total shear area of the nine locking lugs 32 is 50% more than that of the two lugs collectively and further, a far better distribution of the stresses imposed by the detonation of a cartridge 23 on which the bolt mechanism 24 is closed, is obtained by the use of the nine locking lugs 32 rather than by the conventional two lugs common in this type of action. A relatively large cylindrical bore 36 extends longitudinally through the bolt 33 from the rear end portion thereof, forwardly through the main body portion 37 of the bolt 33 thence at a reduced diameter 38 that is finally tapered, see numeral 81. to an exit hole 39 in the bolt face 40. This longitudinal bore comprising sections 36, 38, 39, and 40 afford a cylindrical housing for the firing pin assembly 41 which will hereinafter be described in detail.

The locking lugs 32 machined into the forward end portion of the breech bolt proper 33, are held indexed to register with the cooperating receiving lugs 31 in the receiver ring 26 by means of a bolt stop 42 which rides in a longitudinal grove 42' machined into the underside of the breech bolt 33.

This bolt stop mechanism 42, which is in the form of a milled block and which will be presently described in detail in this application and further in a divisional application directed to the trigger mechanism filed of even date herewith. This bolt stop mechanism as an entirety, comprises a release lever 44, pivotally mounted on the trigger housing 43 and actuated by trigger movement, as will become apparent. Further components include a vertically disposed bore 47 having a stop shoulder 48 substantially at the longitudinal center of the upper edge portion of the trigger housing 43 affords a mounting station for the bolt stop stud 49, the upper end portion of which is dimensioned to a close working fit with said bore 47 in the trigger housing 43. The lower end portion of said stud 49 being in the form of a shaft 50 of reduced diameter and having a close working fit with a reduced bore in said housing that has an exit hole 51 in the lower edge portion of the said trigger housing 43. This trigger housing 43 is mounted on an upstanding lug 52 on the underside of the receiver 12 by means of a mounting pin 53, and a vertically disposed bore 54 in said underside of the receiver 12 is in axial alignment with the bore 47, in the trigger housing 43, as mounted, see FIG. 1. A coiled spring 55 is held positioned within the bore 47, encircles the shaft 50, and is compressed between the lower edge portion of the bolt stop stud 49 and the shoulder 48 at the lower end of the bore 47 to thus project the stud 49 into constant spring tensioned engagement with the breech bolt 33 and its cooperating longitudinal groove 42'. An annular groove 56 in the lower end portion of the shaft 50 provides for the mounting of a split ring washer thereon whereby the bolt stop stud 49 may be released completely from engagement with the breech bolt 32, by the downward movement of an offset arm 58, forming a part of the bolt release lever 44. When the latter is manually moved into engagement with the split ring washer 57, by the action of holding back of the trigger finger piece 59, which causes the bolt release lever 44, to rotate about the bolt release pin 60, thereby withdrawing the bolt stop stud 49 from engagement with the breech bolt 33 to permit the same to be withdrawn from the receiver 12.

It is important to note that the groove 42', machined in the underside of the breech bolt 33, and best illustrated in FIG. 9 of the drawings, is relatively shallow and longitudinally disposed, extending along the said underside of the breech bolt 33 when the same is positioned for endwise movement in the receiver. This groove 42' is dimensioned to receive the bolt stop stud 49 and affords positive indexing of the mating lugs 31 and 32 respectively. The bolt stop stud 49 rides in this groove 42' during the endwise movements of the breech bolt 33 after the same is rotated to move the lugs 31 and 32 out of engagement and the inadvertent withdrawal of the breech bolt 33 is prevented by engagement, of said stud 49, riding in the groove 42' under tension, and a stop shoulder, not shown, which terminates the forward end portion of said groove 42'. The rear end portion of the groove 42' is terminated in a rearwardly and upwardly inclined ramp 61 formed in the groove 42' thereby extending the same to the plane of the outer circumferential surface of the breech bolt 33, said ramp 61 being terminated at a point just forward of the locked position of said breech bolt to thus permit movement of the bolt stop stud 49 out of engagement with the groove 42' and permit said bolt to rotate about its longitudinal axis and similarly the lugs 31 and 32, into or out of locked engagement.

A new and novel system of breeching imparts great additional strength to the instant action far beyond that achieved in conventional actions of the bolt action type. In such conventional counterparts, there is a portion of the case head 23' of the cartridge case 23 that is not supported by the chamber in the barrel 13 or the locked breech bolt 33. The improved method of breeching described and claimed herein is accomplished by complete enclosure of the cartridge case head 23' in a relatively deep counterbore 62, in the bolt face 40, and a further counter-bore 63, of substantially the same depth, in the breech end portion of the barrel 13 which chambers that portion of the breech bolt 33 in which the case head 23 is chambered to thus totally enclose the cartridge 23 within the barrel 13, or more specifically within its chamber.

As a further safety factor, and in addition to the improved method of breeching and high strength of locking, there is provided in the instant breech mechanism, novel and improved means for the control of gases escaping from a detonated cartridge that might flow back into the breech mechanism. Obviously, such gases will seek the path of least resistance and will naturally flow back through the firing pin hole 39 in the face of the breech bolt 33 and thence into the interior thereof. To disperse these gases, there is provided a plurality of longitudinally disposed gas escape ports 64 in the breech bolt 33 connecting the interior thereof to atmosphere. Surplus gases that do not escape through the breech bolt gas ports 64 will continue rearwardly through the bolt sleeve and will be deflected outwardly thereof by the bolt sleeve cap, a novel structure that will presently be described.

It is important to note a still further safety factor relative to the control of gases in the event of a pierced primer or similar occurrence, which consists in providing a substantial shoulder 65 at the forward end portion of the breech bolt 33 immediately behind the locking lugs 32 which tends to direct any unconstrained gases outwardly and away from the face of the shooter.

It is noteworthy in making reference to the shoulder 65 and the locking lugs 32 that obviously the outside diameter of said locking lugs and the main body portion of the breech bolt 33 are identical thus making it possible to machine the bolt 33 and the locking lugs 32 within a few thousandths of the inside diameter tolerance of the receiver sleeve 12 in which the breech bolt is mounted for endwise movements in a longitudinal plane. This structure combined with a flush extractor mechanism, permits manufacture to precise tolerance and the elimination of the inherent looseness of the bolt 33 in the receiver 12 so common in conventional actions of this type.

The extractor mechanism is extremely simple, the same

being comprised of the extractor 66 in the form of a longitudinally disposed finger having a hook 67 on its forward end portion and a transversely flat rearwardly projecting flange 67' at the rear end portion thereof. This finger 66 is pivotally mounted in a longitudinal slot 68 with working clearance for rocking movements about its fulcrum which is in the form of a mounting pin 69 that extends transversely through aligned bores in the breech bolt 33 and a bore in the finger member 66. A relatively shallow transverse bore 70 is machined into the breech bolt 33 at the rear end portion of the slot 68 and affords a mounting station for a coiled extractor spring 71 that is held compressed between the base of the bore 70 and the rear end portion of the extractor finger 66 which overlies the bore 70 when the extractor elements are held in assembled relation by the pin 69. A cooperating ejector 72 is mounted for longitudinal endwise movements in a bore 73 projecting rearwardly from the bolt face 40 into the main body portion of the breech bolt 33, the rear end portion of said bore affording a mounting station for a coiled ejector spring 74. Said ejector spring is held compressed between the inner end portion of the bore 73 and the base of the ejector 72 that is in the form of a cylindrical block, having a relatively short longitudinally disposed kerf 75 milled in one side thereof to afford working clearance for an ejector pin 76 that is provided to limit the endwise movements of the ejector, see FIG. 8. The ejector pin 76 is mounted in a transverse bore in the breech bolt 33 and has tight fitting driven engagement therewith. As will be seen by reference to FIG. 8, both the extractor finger 66 and the ejector block 72 are mounted in, and adjacent to, the bolt face 40 in a flush manner circumferentially, relative to the outside diameter of the breech bolt 33 and the locking lugs 32. The forward end portion of the said extractor finger and the said ejector block are forwardly projected into the counterbore 62 in the bolt face 40 to engage the extractor rim of the cartridge 23, and the case head when the breech bolt is closed and locked thereon.

It is important to note that by virtue of the novel arrangement of the receiver and locking lugs 31 and 32 respectively, a short upstroke of the bolt handle 34 causes extraction of the cartridge 23 from the chamber in the breech of the barrel 13 by engagement of the hardened and polished bolt cam, and as the open bolt is moved rearwardly, the action of the spring loaded ejector block 72, impinging the case head of the said cartridge will cause the spent case to be fully ejected from the firearm as soon as the case mouth clears the front receiver ring 26. Obviously, because of the smoothness of operation achieved by the adaptability of the instant breech action to be manufactured under close working tolerances; the polished and hardened mating surface, and the short up stroke of the bolt, much greater speed of bolt manipulation for extractor, ejection and reloading is achieved, a highly important factor in game shooting.

The firing pin assembly 41 comprises the integral firing pin proper 79 having a forwardly tapered outer end portion 80 terminating at its extreme outer end portion in a point 81 having a radius 81'. A shoulder 82 at the rear end portion of the said forwardly tapered section; and a section of enlarged and constant diameter 83, rearwardly of said shoulder 82, the extreme rear end of which is screw threaded, see numeral 84, for engagement with a cocking piece 85, the construction of which will presently be described. A relatively heavy coiled firing pin spring 86 encircles the main body portion 83 of the firing pin proper 79 and has for a base of resistance at its forward end portion, a sleeve 87 having a central longitudinal bore 88 through which the firing pin proper 79 extends. This sleeve 87 is dimensioned to close working fit with the inside diameter of the breech bolt 33 and is flattened at diametrically opposite sides, see numeral 89, parallel to the axis of said sleeve to provide for unrestricted communication with the gas escape ports 64 in the breech bolt 33 in the event of a pierced primer or the like as previously stated.

To restrict the inadvertent rearward movement of the firing pin assembly 41 in the event of cartridge case or primer failure and further to lock said assembly in proper assembled relation against axial rotation, there is provided in the firing pin proper 79, a longitudinally disposed slot or ball-race 90 that is filled into the circumferential surface of said firing pin 79 at the rear end portion thereof immediately forward of its screw threaded portion. This milled slot 90 is relatively shallow and transversely flattened and terminates at each end thereof in a sharp shoulder 91 to thus provide a restricted ball-race for a firing pin retaining ball 92. Said firing pin retaining ball 92 is held positioned, relative to the assembled breech bolt 24 in a transverse bore 93 in the forward end portion of the bolt sleeve 94 between the interior of the breech bolt 33 assembled on the bolt sleeve 94, and the milled slot 90 in the firing pin 79. It is to be understood that assembly and dis-assembly of the above noted elements will be presently described following a description of the bolt sleeve 94 and its assembly with the firing pin 79 and cocking piece 85.

Said cocking piece 85 has screw threaded engagement with the rear end portion of the firing pin 79 and is provided with a rearwardly projected indicator member 95 that is visible beneath the bolt sleeve 94 when the breech action is in cocked position. Thus visual indicator 95 provides a highly important additional safety factor as the shooter can instantly discern by a glance, whether or not the action is cocked.

A novel and symmetrical bolt sleeve 94 is constructed and designed to streamline the rear end portion of the breech action which formerly, in bolt action type rifles has been unsightly and open to the elements and foreign matter. This bolt sleeve 94 is positioned to rearwardly project the lines of the rear receiver bridge 29, which it abuts in endwise engagement, when the breech bolt assembly 24 is closed in the receiver section 12. From this forward abutting engagement with the rear end portion of the said receiver bridge 29 the bolt sleeve 94 has, rearwardly, and inwardly, in a lateral plane downwardly converging lines terminating in a solid end cap 96 that is integral with the bolt sleeve thereby affording a complete steel closure to protect the face of the shooter, by deflecting downwardly, any gases which might be forced rearwardly passed the gas escape ports 64 in the tubular breech bolt 33 as the result of a pierced cartridge primer.

To dis-assemble the breech bolt mechanism it is, of course necessary to unload the chamber in the barrel 13 and the magazine box 17 of all ammunition and remove the breech bolt assembly 24 as an entirety from the receiver section 12 of the firearm. Said breech bolt assembly being removed by opening and drawing the said bolt assembly rearwardly and then pulling the trigger mechanism 16 to release the bolt from engagement with the bolt stop mechanism 42. With said breech bolt removed from the firearm and by the use of any sharp cornered right angle object as a base of resistance, the cocking piece 85 is pushed rearwardly approximately one eighth of an inch and rotated either to the right or left onto its engaging shoulder on the bolt sleeve 94 and thence unscrew the breech bolt 24 from the firing pin assembly 41. After one or two rotations thereof, remove the firing pin retaining ball 92 through a helix opening in the breech bolt 33.

With the bolt mechanism now separated from the firing pin assembly 41, the cocking piece 85 is released from its engaging shoulder to decompress the firing pin spring 86. The firing pin 79 is then completely unscrewed from the cocking piece 85. Assembly is done in reverse order, however, it is important to note that in replacing the firing pin retaining ball 92, that the

same is positioned to ride on the flat of the milled slot 90 in the firing pin 79. This novel design enables the complete disassembly of the firing pin and bolt sleeve assembly without the use of any tool, an operation not possible with any other conventional action all of which require the use of various tools to accomplish said disassembly.

It will be understood that the drawings illustrate a complete breech mechanism of the bolt type and that certain of its components have only been briefly noted herein for the reason that no inventive concept was involved. It has not been thought necessary to describe such structure in detail as it is common to all firearms of this type.

While there are herein disclosed but a limited number of embodiments of the structure, process and product of the invention herein presented, it is possible to produce still other embodiments without departing from the inventive concept herein disclosed, and it is desired, therefore, that only such limitations be imposed on the appended claims as are stated herein or required by the prior art.

What I claim is:

1. A breech mechanism for firearms of the bolt action type comprising in combination, a receiver having a forward receiver ring and a rearwardly spaced receiver bridge, a pair of laterally spaced longitudinal receiver rails integrally connecting the receiver ring and the receiver bridge, a barrel having internal screw-threaded engagement with the receiver ring, a chamber in the breech end portion of the barrel according to caliber and case dimensions of the cartridge to be chambered for firing said chamber, a cylindrical tubular breech bolt having a bolt sleeve and a bolt handle, said breech bolt being constructed and dimensioned for mounting in the receiver, with a close working fit, for limited endwise movements and rotation about its longitudinal axis, a plurality of nine, longitudinally and circumferentially spaced locking lugs formed integral with the forward portion of the breech bolt, said lugs being in a flush longitudinal plane with the main body portion of said breech bolt, said nine locking lugs having mating surfaces with a like plurality of nine receiving lugs machined internally in the receiver ring, a longitudinally disposed groove machined in said breech bolt to engage and cooperate with a bolt stop mechanism when the breech bolt is open to thus index the locking lugs and the receiving lugs for inter-locking engagement while the breech bolt is moved endwise to its closed position and thence rotated about its longitudinal axis, said groove at its rear end portion terminating in a rearwardly and upwardly inclined ramp affording means whereby the bolt stop mechanism will ride out of engagement with the groove to permit axial rotation of said breech bolt when the same is in its forward or closed position and thus allow disengagement of the respective locking lugs and receiving lugs, the one group from the other, said bolt stop mechanism comprising a vertically disposed spring loaded plunger mounted in the trigger mechanism for constant endwise engagement with the breech bolt, and withdrawn from such engagement by the holding back of the finger member of the trigger mechanism to release the bolt for withdrawal from the receiver, a firing pin assembly mounted for endwise movements in the tubular breech bolt, said firing pin assembly comprising a firing pin, a firing pin spring, and a firing pin sleeve, and a cocking piece, said firing pin spring encircling the firing pin and positioned between said firing pin sleeve and the said bolt sleeve, and a firing pin exit hole in the bolt face of the tubular breech bolt affording a gas escape port between the chamber in the barrel and atmosphere.

2. The structure defined in claim 1 further including a trigger controlled firing mechanism, said mechanism being contained entirely within the breech bolt and the receiver and comprising, a firing pin mounted for endwise movements in the tubular breech bolt, a firing pin spring encircling the firing pin and positioned between a firing pin sleeve and the bolt sleeve, a shank on said bolt sleeve, a cocking piece machined and constructed for endwise movements in the bolt sleeve and rigidly secured to the firing pin at the rear end portion thereof, the shank of said bolt sleeve having screw-threaded engagement with the breech bolt at the rear end portion thereof, said firing mechanism being urged into cocked engagement with the trigger mechanism to compress the firing pin spring by engagement of cam surfaces at the forward end portion of the cocking piece and cam surfaces at the rear end portion of the breech bolt activated by the raising of the bolt handle to rotate the breech bolt about its longitudinal axis, said firing pin adjacent its rear end portion having a longitudinally disposed slot having front and rear shoulders, a transverse bore in the shank of the bolt sleeve in register with the slot in the firing pin when the breech mechanism is assembled, said transverse bore affording a housing for a firing pin retaining ball held positioned between the breech bolt and the shank of the bolt sleeve to hold the firing pin against axial rotation and unrestricted rearward movements.

3. The structure defined in claim 1 further including a rearwardly projected extension integral with the lower rear edge portion of the cocking piece said extension being dimensioned to visibly protrude beneath the bolt sleeve when the breech mechanism is in cocked position.

4. The structure defined in claim 1 wherein the bolt sleeve is a unitary housing having a forwardly projected tubular shank having screw threaded engagement with the rear end portion of the breech bolt, said housing at its lower edge portions being slotted to afford a passageway for the endwise movements of the cocking piece and its rearwardly projected extension, the top side and rear portion of said housing affording a solid closure covering the rear end portion of the firing pin and the cocking piece, and dimensioned at its forward edge portion to mate with the rear end portion of the rear receiver bridge and endwise abut the same with a close fit when the breech mechanism is in closed position.

5. In a bolt action firearm, a breech mechanism comprising a receiver having a barrel receiving ring at its forward end and a spaced receiver bridge at its rearward end including intermediate laterally spaced rails integrally connecting said forward receiver ring with said rearward receiver bridge, a barrel mounted in said receiver ring, said barel having a hollow chamber in the end adjacent said receiver ring for reception of a cartridge, an elongated longitudinally extending breech bolt having a bolt handle extending laterally outward therefrom, said breech bolt being adapted to be mounted in said receiver in close working tolerance and movable rectilinearly forward to close against said barrel and receiver ring and movable rearwardly away from said receiver ring, said bolt being movable about its longitudinal axis, said breech bolt having a longitudinally extending groove with said groove at its rearward end terminating in a shallow inclined ramp, a breech bolt stop mechanism for cooperatively engaging said longitudinal groove, said bolt stop mechanism having a spring biased projection adapted to be biased into sliding engagement in said groove to thereby provide a guideway for said bolt during its forward movement toward the receiver ring and barrel, said ramp acting to force said projection out of engagement in said groove when said bolt reaches its forward position whereby the bolt may be rotated axially to be locked in its closed position, a pivotally mounted trigger having portions engaging said projection for drawing said projection out of the groove whereby when the bolt is unlocked it may be slid rearwardly entirely out of said receiver upon actuation of said trigger.

6. A breech mechanism according to claim 5, wherein said locking of the breech bolt when the breech bolt is

in its forward closed position comprises a plurality of sets of cooperating interlocking lugs, one set of said lugs being formed integrally with said breech bolt and recessed in a manner that the outer surfaces terminate flush with the plane formed by the adjacent cylindrical surfaces of the bolt, the other set of lugs being formed integrally with said receiver ring and projecting outward, said lugs having longitudinal spacing to permit said bolt to be moved toward said receiver ring until the lugs are laterally offset from one another whereby axial rotation of the bolt will lock the lugs together in interlocking relation.

7. A breech mechanism according to claim 5, wherein said rearward portion of the bolt comprises an exterior housing for said firearm, said exterior housing being slidably movably with said bolt, said exterior housing enclosing the rear portion of said bolt with the upper edge of the housing confronting the rear edge of the receiver bridge to provide a guard and seal closure of the bolt to thereby prevent the gases created by the firing of the firearm from projecting rearward against the face of the operator as well as to seal the end of the bolt from its exterior environment.

References Cited in the file of this patent

UNITED STATES PATENTS

115,911	Choate	June 13, 1871
277,385	Villa	May 8, 1883
579,994	Mauser	Apr. 6, 1897
749,214	McClean	Jan. 12, 1904
1,140,245	Bubar	May 18, 1915
1,359,045	Fisher	Nov. 16, 1920
1,430,661	Lewis	Oct 3, 1922
1,557,435	Diehm	Oct. 13, 1925
1,685,148	Conant	Sept. 25, 1928
1,892,141	Garand	Dec. 27, 1932
2,099,035	Rowley	Nov. 16, 1937
2,481,548	Waltke	Sept. 13, 1949
2,585,195	Walker	Feb. 12, 1952
2,618,878	Mulno	Nov. 25, 1952
2,745,203	Ruple	May 25, 1956

FOREIGN PATENTS

839,247	France	Dec. 26, 1938