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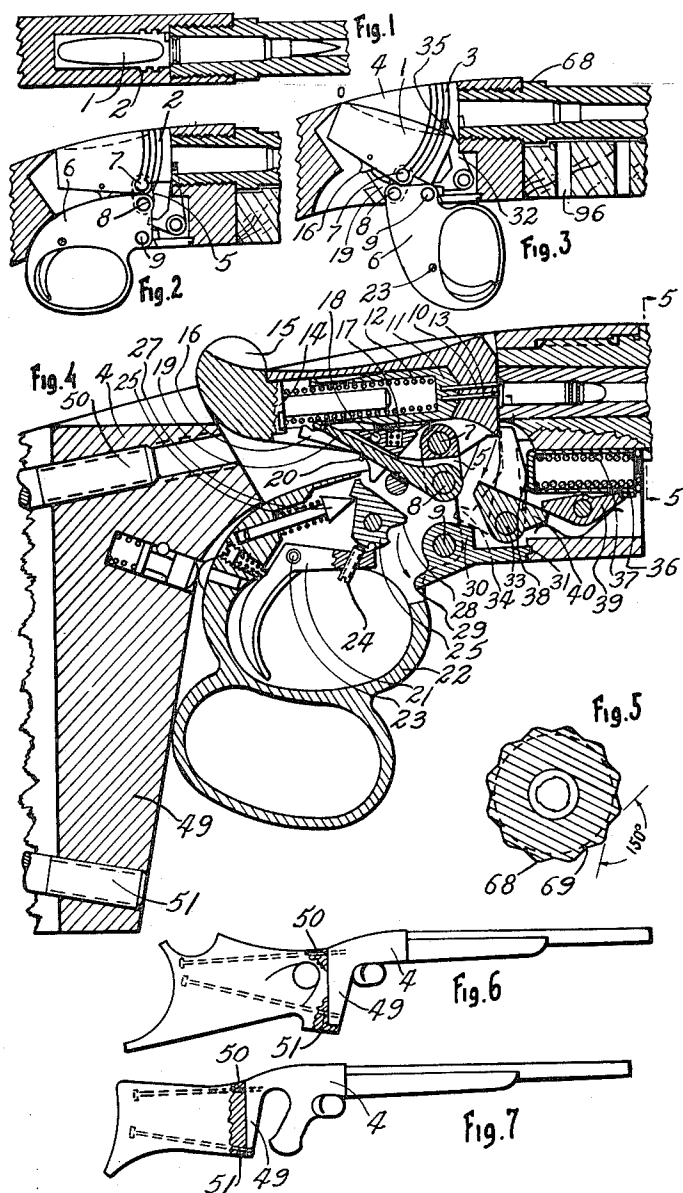
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FIREARM WITH REARWARD SWINGING BREECH BLOCK

Filed Feb. 14, 1957

2 Sheets-Sheet 1



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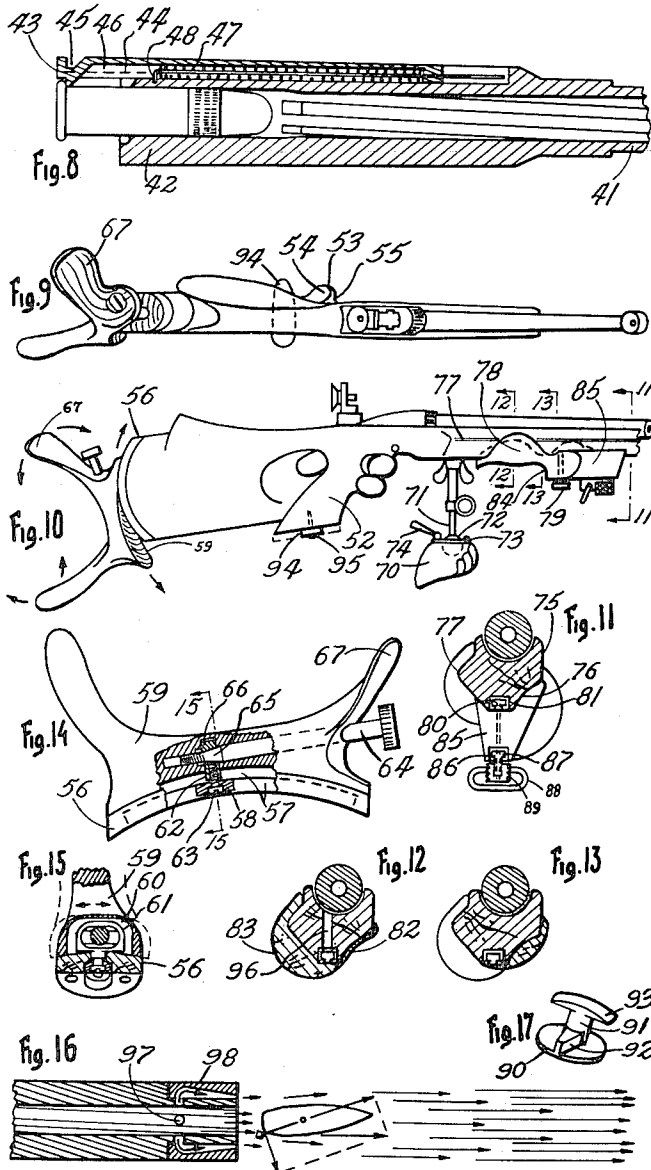
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2 Sheets-Sheet 2



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2,952,934

## FIREARM WITH REARWARD SWINGING BREECH BLOCK

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1 Claim. (Cl. 42—28)

The present invention relates to a rifle and devices intended for improving the accuracy of shooting and rendering its practical use easier.

The mechanisms and accessories of rifles and devices known present various inconveniences as regards high class shooting, or high pressure powders must be used, in which case the rigidity of the breech and the absence of its vibration, which engenders that of the barrel, are of the greatest importance. Practically all the existing breeches, cylindrical, falling blocks, rocking, etc., when submitted to the violent shock of the gases, vibrate due to the fact that their parts offer an indispensable play for the functioning and manipulation, while the materials themselves undergo a deformation of flexion and compression which are immediate, and whose flexible reaction gives rise to a powerful recoiling of the breech block in the manner of a hammer rebounding from the anvil, thus communicating a noxious vibration to the entire mechanism and to the barrel. Another great inconvenience of the present mechanisms consists in their inability of inserting in the chamber of the barrel, by manual moderate effort, a slightly deformed or imperfectly resized cartridge, which often requires a troublesome selection of ammunition.

In accordance with the present invention, these inconveniences are eliminated by means of a hinging breech block having on each side, in front, one or more circularly formed lugs which become engaged in the corresponding grooves of the breech block receiver, and which are intended for imparting to the breech block a hinging movement around a virtual axis situated in the rear, and somewhat above the axis of the barrel, the breech block being linked with its front part by means of a little link with a locking lever latch bolt pivoting around a pin lodged in the breech block receiver in such a manner that it forms a vertical toggle joint opening up towards the rear and with its lower part capable of firmly wedging the breech block against the barrel and of driving into its chamber the cartridge with an extremely powerful final pressure.

An important shortcoming of rifles and devices known at present, relating to the accuracy of firing, is caused by the weakening of the butt shocks through the bedding of mechanisms which cannot be given the artillery carriage dimensions. The thus weakened butts resist inadequately the recoiling shocks, flinch and inflict upon the entire weapon an angular displacement accompanied by vibrations which are not strictly constant. In accordance with the form of the present invention, a very rigid bedding is achieved by adding to the breech block receiver in its rear portion, a massive and long vertical stock bedded in the butt grip and attached thereto by two bolts screwed to its extremities. In accordance with another form of execution, a very rigid casing is achieved by adding to the breech block receiver a long vertical stock fixed to the breech by two bolts screwed to its extremities.

An easy position allows easing of the shooting which is not the case with the present butt grips where the middle finger in going excessively around the grip is spread

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away of the more forward position of the index and sustains a disagreeable feeling impeding the delicate operation of the index. In accordance with the present invention, the butt grip is provided with a lateral protrusion in order to form in the rear a support for the thumb and in front a cross support for the middle finger, these two fingers and the index having the functional habit of working concertedly, should have their tips as close together as possible, so that the pull of trigger may take place physiologically without the slightest organic discomfort.

It is also known that shooting with small calibre with rim fire cartridge represents a splendid exercise for big bore shooting for which purpose there are so-called reduction apparatus, serving the purpose of introducing into the high power barrel a small bore tubing and into the chamber a miniature small bore breech block with a device for transforming the centre fire into a rim fire. Considering that in these apparatus, the central firing pin point is evidently damaged thereby, the advantages of this system are generally dispensed with.

In accordance with a form of execution of the present invention, the big bore breech block contains a firing pin whose eccentric point can assume the positions of central or rim fire, for which purpose the breech block possesses two perforations for the passage of the point of the firing pin; one of them coinciding with the big bore barrel axis and the other with the rim fire impact, in such a manner that the type of percussion can be changed by transposing the firing pin point. As regards the small bore extractor, it is of sliding type and disposed in the slot at the end of the small bore barrel, whose form fits the big bore chamber. Thus, only one weapon is used for the two types of shooting without replacing the firing pin and the extractor, which is of great practical importance.

For the purpose of combatting the deviation of the bullet produced at the muzzle of the barrel by the blast of gases, lateral slots are made sometimes on the barrel somewhat to the rear of the muzzle destined for releasing the final pressure of the gases by combining it sometimes with a muzzle brake. On the other hand, owing to the fact that the bottom of the bullet leaving the barrel is bombarded by the gas molecules and incidentally by the powder molecules in a state of unaccomplished combustion, a torque and variable complex of disturbing forces between this unsymmetrical thrust, the centre of the living force of the bullet and the center of air resistance takes place, making a very dense fluid mattress which in its first phase disturbs the bullet in its trajectory in order to stabilize it subsequently, with the assistance of the rotation when the effect of the gases is finished.

In accordance with a form of execution of the present invention, the deviation of the bullet at the muzzle of the barrel is attenuated by means of slots made laterally at the end of the barrel across which the gases escape and which are directed ahead of the bullet by means of a proper muzzle thimble wholly or in part, in order to stem the air of the area where the bottom of the projectile undergoes the noxious bombardment.

In free rifle shooting, the accuracy depends, among other things, on the good position of the weapon. Among the accessories at present in use for this purpose, the palm rest is generally used in competitive shooting in a standing position. Its forms are varied and individual. It is attached to the fore end by means of a support and provided with a device regulating its distance from the fore end and sometimes also its longitudinal inclination, but there are no devices making possible the equal adjustment of its transversal inclination and the fixing of the palm rest in any given position in relation to its support, which is important for an easy position of an orthopedic palm rest. In accordance with the present invention, the

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fixing of the palm rest to its support is accomplished by means of a ball at the end of the supporting stem which ball is lodged in a cavity with a semi-spherical bottom made in the palm rest, wherein it is forced by an adapter ring, whence the possibility of immobilizing the palm rest in every desired position.

In other positions of free arm rifle shooting, such as prone and kneeling, the form of the fore end is of particular importance so that all the nerves and muscles of the hands resting thereon be stressed uniformly without uncomfortable pressure at certain points of the flesh. However, considering that the plasticity of the hand in a relaxed half open position discloses unsymmetrical cross-sections; narrow in front of the index side, large in the middle of the palm and narrow behind the thumb side, it has been impossible to realize up to the present time a convenient form of fore end without certain points hurting the hand, thus troubling the composure of the organism.

In accordance with a realization of the present invention, a section of the fore end identical along its whole length assumes an unsymmetrical contour as follows: Its narrow rounded base is prolonged on the side of the thumb into an inclined curve rising concavely to assume the thenar thumb muscle, and on the side of the index over an incline rising and rounding out, both at half height of the fore end, climbing up again from there inclined towards the barrel. Such a form is equivalent to the average section of the half open hand.

In accordance with another realization of the present invention, the fore end is provided, at its lower part, with a longitudinal slide receiving a traversing slider in the form of a T. The cut of the fore end is similar to the one described above. An orthopedic removable hand rest, externally similar to the inside part of the half-open relaxed hand, having in front of it a body with a supporting surface, is freely disposed on the fore end and attached thereto in the desired position by means of a bolt traversing it and screwed onto the traversing slider, in such a manner that the hand acquires indirectly a firm grip which is orthopedic along the entire length of the fore end, without pronounced pressure on the sensitive points of the flesh, whence a shooting without fatigue.

The removable hand rest can be provided with a slide lodged in the body in front of the supporting surface for the reception of the quickly attachable traversing slider, equipped with a sling swivel. The attachment and adjustment of the length of the sling and of the loop is made at present by means of screws, hooks, knobs with two discs and other inconvenient devices which take long to handle and for this reason are likely to disturb indirectly accuracy of shooting.

In accordance with the present realization of the invention, the attachment and rapid adjustment of the sling swivel and of the loop to the fore end, or its hand rest, is done rapidly by means of a traversing slider in the form of a T, engaged in their slide and blocked in the desired position by means of a push-pin retainer disposed in the traversing slider and provided with a gripping knob in the form of a U laterally knurled. In accordance with another realization of the present invention, the adjustment of the length of the sling and of the loop is done by means of a button having at one end of its stem a flat disc with a pawl inside of it entering into a notch in the sling, and at the other end of the stem, a cross-bar with flat arms, covering the second sling, at right angles in relation to the pawl. Thus, it becomes very easy to cross the flat arms over the notches of the sling.

In the free rifle shooting, the form and the adherence of the butt plate to the body of the shooter exert a great influence on the accuracy because it is on the butt plate that a great measure of the required stability of the rifle depends. As a matter of fact, general use is made of the same butt plates of a somewhat orthopedic form for the various shooting positions in which the stock

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assumes various distinct directions and distances in relation to the cheek of the shooter to his shoulder and to his arm, for which purpose they can be adjusted as to height and sometimes as to length. But this adaptation is far from being satisfactory in view of the fact that the butt plate always rests in the same middle plane of the rifle, while the shoulder of the shooter deviates therefrom in accordance with the position, whence the various points of support on the body, that is to say, in standing position on the root itself of the biceps and under the armpit where the powerful recoiling shocks affect the principal nerve of the entire arm, thus disinclining him from firing the shot with ease. In the kneeling position, it is the muscles of the shoulder which are hammered, and in the prone position it is the clavicle and its flesh which offer the least vulnerable support. In these three positions, the actual butt plates do not engage, with their entire form, the parts of the shooter, except partially, whence the tendency of the stock to shake and tremble making its stability weak and doubtful.

In accordance with a form of execution of the present invention, the hook butt plate, orthopedic in form, is perfectly adaptable to the shoulder of the shooter in all the positions, thanks to a base plate fixed at the end of the stock having on its exterior a spherical convex surface whereon the spherical convex surface of the hook butt plate fits and which is fixed in a desired position by an appropriate device. Thus, we are in the position to adjust the butt plate as to height and length and to turn it at the same time in order to impart to it an angular inclination in order that its orthopedic form might rest with all its surface against the clavicle and shoulder, and this in every position of shooting, whence the stability of the weapon is considerably improved.

The handling of the transport of rifles at present is not often comfortable. One does not know how to lay them on the ground, either during the shooting or while waiting for one's turn. They are placed on the ground which is bad for the metallic or optical gun sights, and which is extremely tiresome for the shooter. They are hard to dispose of for purposes of convenient cleaning whence the necessity of providing them with a special device for holding them up in order to keep them up in a horizontal position.

In accordance with a realization of the present invention, the pistol grip of the butt is provided below with a small pivoting plate, lengthy in form, which is placed across to serve as a stand to hold up in a vertical position the rifle deposited horizontally. In accordance with another realization of the invention, a protrusion is imparted to the base of the pistol grip on each side to form a supporting base plate. It is not feasible without special tools to screw the present round barrel onto the breech receivers.

In accordance with a form of execution of the present invention, the barrels must be equipped for this purpose, on the side of the breech receiver, with a crown sufficiently large and having twelve longitudinal recesses at 150 degrees, destined to receive the twelve (12) teeth of a standard ring wrench with two sets for hexagonal nuts.

Experience has shown that the accuracy of the barrel diminishes with the rise of its temperature whence the necessity of actuating the ventilation of the present barrels in the part covered by the fore end. In accordance with the realization of the present invention, the increased ventilation of the barrel under the fore end is achieved by installing for this purpose, perforations in the fore end, opening into the gap of the barrel.

The drawings attached herewith, made by way of example, demonstrate in various scales, some forms of execution of the invention.

Figure 1 is a view in partial section, of the mechanism of the weapon.

Figure 2 is an elevation in partial section, of the mechanism with a closed breech.

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Figure 3 is an elevation in partial section, of the mechanism with an open breech.

Figure 4 is a detailed vertical section of the mechanism with a closed breech, and showing modifications of the receiver, breech block, breech and cocking lever.

Figure 5 is a cross section on line 5—5, of the wrench crown of the barrel.

Figure 6 is an elevation in partial section of a realization of the breech block receiver with a vertical stock bedded in the pistol grip of stock.

Figure 7 is an elevation in partial section of another realization of the breech block receiver with a vertical stock.

Figure 8 is a longitudinal section of the rear of the small bore tubing barrel.

Figure 9 is a view in perspective from above, of the rifle with the hook butt plate adjusted for the shooting in standing position.

Figure 10 is an elevation of the rifle with the butt plate adjusted for shooting in standing position.

Figure 11 is the frontal view on line 11—11 of the slide hand rest of the fore end.

Figure 12 is the cross section on line 12—12 of the slide hand rest.

Figure 13 is a cross section on line 13—13 of the slide hand rest.

Figure 14 is an elevation in partial section of the hook butt plate and of its ground base.

Figure 15 is a cross section on line 15—15 of the hook butt plate and of its ground base.

Figure 16 is a longitudinal section of the muzzle of the barrel.

Figure 17 is a view in perspective of the sling knob.

The rifle shown in Figures 1 to 17 comprises a hinging breech block 1, provided on each side of its front part with at least one circular lug 2, which slides in the circular corresponding groove 3, made in the walls of the breech block receiver 4. Thus the breech block rocks around a virtual axis O situated in the rear and above the barrel axis at about the level of the top of the cartridge chamber.

The locking device of the breech block is made by means of a toggle joint consisting of a forked link 5, of a locking lever 6, and of pins 7, 8, and 9, situated approximately at right angles to the barrel axis, the middle pin 8 which is slightly in advance of the latter pin 9 in order to achieve a definite locking. The locking device opens up towards the rear and the bottom. The percussion is convertible for center fire or rim fire. The interior of the breech block 1 is hollow to receive the main body of a hollow firing pin 11 provided in its nose with two eccentrically arranged, elongated pin points 10 and 13. These points 10 and 13 are slidable in two perforations in the forward end of the breech block 1. The axis of one perforation is disposed to lie along a plane intersecting the axis of the barrel at their points of juncture for centerfire and the axis of the other perforation is directed to permit a firing pin point therein to impact the rim of the percussion cap for rim fire. The pin point 10 is of a length sufficient to project beyond the front face of the breech block when disposed in either of the perforations to engage the percussion cap of a bullet when the main body 11 of the firing pin is in its forward position.

In order to vouchsafe a smooth gliding of the firing pin considering the small torsion effect of the percussion spring 12, the pin point 13, of a shorter length than pin point 10, is arranged symmetrically with pin point 10 in relation to the axis of the firing pin 11. The two pin points 10 and 13 sliding in the perforations provided therefor serve as a stabilizer for the main body 11 during its sliding movement in the recess provided in breech block 1 for the main body. The spring 12 is supported in the rear on a plug 14 screwed bayonet fashion to the breech block. In order to adapt the firing pin for rimfire or centerfire, the plug 14 is removed and the firing pin 11 is withdrawn to an extent which will permit the insertion

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of pin point 10 in the particular perforation depending on whether rim or centerfire is desired. The pin point 13 will be inserted in the remaining perforation and the plug 14 will be refitted in the open end of the recess in the breech block as above described. The plug may be provided with a deflector 15, projecting laterally the ejected cartridge cases. The sear 16 is placed in the opening of the breech block itself at the lower side. It contains its spring 17 and pivot around the pin 18. The sear is split to allow a bias passage of the rod 19 which is articulated on the middle pin 8. The rod cocks the firing pin and is pushed against it by a spring 20, partially drawn in Figure 4. The trigger 21 and its spring with adjustable pressure is installed in the slot of the locking lever 6 to which also is added the trigger guard 22. The trigger pivots on the conical or spherical points of the two screws 23 which eliminates all play, the trigger has a screw 24 adjusting its engagement in the hammer 25.

The hammer is actuated by its spring 26 by means of a plunger 27. The cocking of the hammer is accomplished at the end of the opening of the breech block for the encounter of its notch 28 and of the nose 29 added to the fixed ranger 30 axed on the pin 9 and wedged by its lug 31 in the breech block receiver. The extractor 32 acts on the pin 33 while thrusting with its arm 34 at the end of the breech block opening against the cam of the ranger (invisible in the drawing, it being on the other side) is displaced also laterally, in order to release its hook 35 of the extraction groove of the ejected case. The extraction can take place also by the automatic ejection (Figure 4). This device comprises a cylindrical ejector 36 installed in the breech block receiver in front of the extractor (the latter being drawn in dotted lines as it is placed in front of the section plan), an ejector spring 37, a lever 38 axed on the pin 33 which rams the surface in front of the breech block during the closing for cocking the ejector and for hooking it onto the pendulum 39, a cam 40 axed on the pin 33 leaning with one arm against the pendulum and exposing its opposite arm to the encounter of the breech block which, while descending, strikes the cam, and the latter rocks the pendulum which releases the ejector for thrusting against the extractor.

As regards rim fire cartridges, it is not necessary to release the extractor laterally, for which reason the lever 38 can be built also to function as an extractor.

In order to complete the conversion of the big bore weapon into a small bore one, the rear part of the small bore tubing barrel 41 is given a form which assumes that of big bore chamber. In the said bulge 42, a sliding small bore extractor 43 is installed, having laterally two lugs 44 (drawn in dotted lines) serving as guides, and one recess 45 for receiving the hook 35 of the big bore extractor. The extractor 43 has on the side of the axis a longitudinal slot 46 wherein its spring 47 threaded on a thin wire whose rear bent end 48 is lodged partially in the bulge 42 in a manner to serve as a second point of support to the spring 47. The small bore extractor is actuated by the big bore extractor.

In order to render the bedding of the mechanism very solid in the butt stock, and thereby to reduce the noxious vibrations, the breech receiver 4 is provided at its rear portion with a massive vertical stock 49 installed in the pistol grip of the butt stock and fixed thereto with two bolts 50, 51, screwed to the extremity of the vertical stock (Figures 4 and 6). In accordance with the invention (Figure 7), the vertical stock terminating the breech receiver is fixed to the buttstock outside of the pistol grip with two bolts screwed to its extremity.

The pistol grip 52 of the butt stock is furnished with a lateral protrusion 53, whose rear facet 54 serves the purpose of supporting the thumb and the facet in front 55 serves as support to the first joint, of the middle finger.

The hook butt plate of the present invention consists of a base plate 56 screwed to the butt stock and having on its exterior a spherical convex surface. In accordance

with a form of execution, the said base plate has a longitudinal slit of a form to receive a slider 58. On the base plate a hook butt plate 59 is resting with its spherical concave surface. The hook butt plate has in its body at least a cross cavity 60 destined to receive a slotted eye lug 61, whose cylindrical collar 62 receives the screw 63 which assembles it with the slider 58 of the base plate. The hook butt plate is freely crossed by a plug 64, having in front a cone 65 which pierces the slotted eye lug and terminates with a threaded screwed portion in the hook butt plate. By thoroughly screwing the plug, its cone exerts a firm pressure against the upper crosshead 66 of the eye lug, having a section making full contact for the cone 65, in a manner to attach the butt plate solidly to its base. The transversal cavity 60, which is longer on each side than the slotted eye lug, thereby makes it possible to displace the butt plate sideways in the two directions in order to adjust a good cheek position of the butt stock, and at the same time the butt plate can be displaced vertically in both directions, thanks to the longitudinal slot where the whole slides; the slide block 58, its screw 53 and the collar 62 of the eye lug, moreover, the butt plate can be turned with the eye lug around the screw 63 considering that the contact surfaces are spherical, which makes it possible to fix the hook butt plate in every necessary direction.

This new feature of the hook butt plate has made it possible to impart to the spatula 67, a deviated form in the direction of the shooter's clavical for the purpose of ensuring a perfect adhesion of the hook butt plate to the shoulder in the various shooting directions.

In accordance with the present invention, the manners of screwing the round barrels onto the breech receivers with the standard tools, comprise a crown 68 added to the barrel at its rear portion and having twelve longitudinal notches 69 with an angular opening of 150°.

In accordance with the present invention, the attachment of the palm rest 70 to the stem 71 of its support comprises; a ball 72 fixed permanently to the end of the stem, a cylindrical cavity with a semi-spherical bottom made in the palm rest and a fixing ring 73 covering the edges of the sphere and fixed to the palm rest in a quickly adjustable manner such as by a screw 74 for tightening firmly the ball to the palm rest.

The fore end 75 of the weapon presents along its entire length the same unsymmetrical section and possesses a longitudinal cylindrical cavity 76 destined to receive the protrusion of the thumb thenar muscle, while the other half of the section presents a triangular form 77 with a rounded top situated at the middle height of the fore end.

A better position is achieved with the detachable hand rest 78 fitted and attached to the fore end by means of a bolt 79 screwed in the slider 80 which is lodged in the slide 81 embedded in the fore end.

The form of the detachable hand rest corresponds to the inside of the relaxed half open hand whose section 12-12 presents on the side of the thumb a cavity 82 destined to receive the thenar protrusion, and on the side of the palm and of the index, ring, and little finger, a bulge 83. The detachable hand rest is furnished on its front part with a lug 84 serving as a support for the hand whose lug body 85 contains a short slide 86 serving as an attachment to the sling. This attachment comprises a slider 87 in the form of a T, furnished with a sling swivel 88 and containing a coil spring acting upon a stopping pusher whose end penetrates into the hole made in the slide, while the other end of the pusher is screwed to the button 89 in U form, whose flanks are knurled on the outside and freely engage the slide 87.

The assembling of two parts of the sling is easily made by means of a button composed of disc 90, of a central stem 91, of a pawl 92 issuing from the interior surface of the disc and of a cross bar with flat arms 93 situated at right angles in relation to the pawl.

The little supporting plate 94 of the pistol grip discloses

a lengthened form and can be turned crosswise around a screw 95 in order to serve as a stand for the rifle.

The ventilation created in the gap of the barrel under the fore end is achieved by means of a certain number of perforations 96 made in the fore end and opening into the gap (Figures 3 and 12).

The deviation of the bullet at the muzzle of the barrel is reduced by means of orifices 97 made laterally at the end of the barrel through which the gases escape which are directed by an appropriate muzzle thimble 98 in its entirety or partially ahead of the bullet.

The functioning of the mechanism is as follows. The opening of the breech is made (Figure 2) by pushing forward the trigger guard 22 of the locking lever 6 which pulls along, by means of a forked link 5, the breech block 1 to make it descend (Figure 3). At the same time the rod 19 pushes backwards and cocks the firing pin 11, which grips the sear 16.

Somewhat before the opening of the breech, the notch 28 of the hammer which is uncocked, meets the nose 29 of the ranger, cocks its own plunger 27 and grips the blade of the trigger 21. The extraction of the cartridge case actuates the breech block at the end of its course by giving a sharp thrust to the arm 34 of the extractor which pulls out the cartridge shell from the chamber by means of its hook 35. The cartridge case which is ejected is projected sideways by the deflector 15. In another realization the automatic ejection of the cartridge case actuates the breech by striking at the end of its course the cam 40, the latter in pivoting releases the pendulum 39 of the cocked ejector 36, which with its energy strikes energetically against the extractor. The cocking of the ejector actuates the breech block during its closing by repelling with its surface, in front of the lever 38, which rams the uncocked ejector 36 until such time as it grips the pendulum 39. In order to release the blow (shot), a pull on the trigger 21 releases from its blade the hammer 25 which thrusts itself against the vertical slit arm of the sear 16, the latter rocks and releases the cocked firing pin 11 whose point 10 pierces at the end of its course into the primer of the cartridge.

I claim:

A firearm with a breech block receiver, a barrel in front of said receiver, a movable hinging breech block, a locking device with a vertical toggle joint opening towards the rear and downward, and an extractor and automatic ejection means, the said firearm being characterized by the fact that the said means comprise a vertical lever, a cylindrical ejector and a spring mounted in the breech block receiver, said lever being destined to receive the push of the breech block as it moves up in order to cock said cylindrical ejector and its spring installed in the breech block receiver in front of the extractor, a pendulum gripping the cocked ejector, a cam resting with one arm against the rear of the pendulum and exposing its other arm to an encounter with the breech block in such a manner that during opening of the breech block it receives a blow from said breech block and transmits the blow to the pendulum which in turn releases the ejector to expel a cartridge case from the cartridge chamber of said barrel.

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