

Feb. 17, 1959

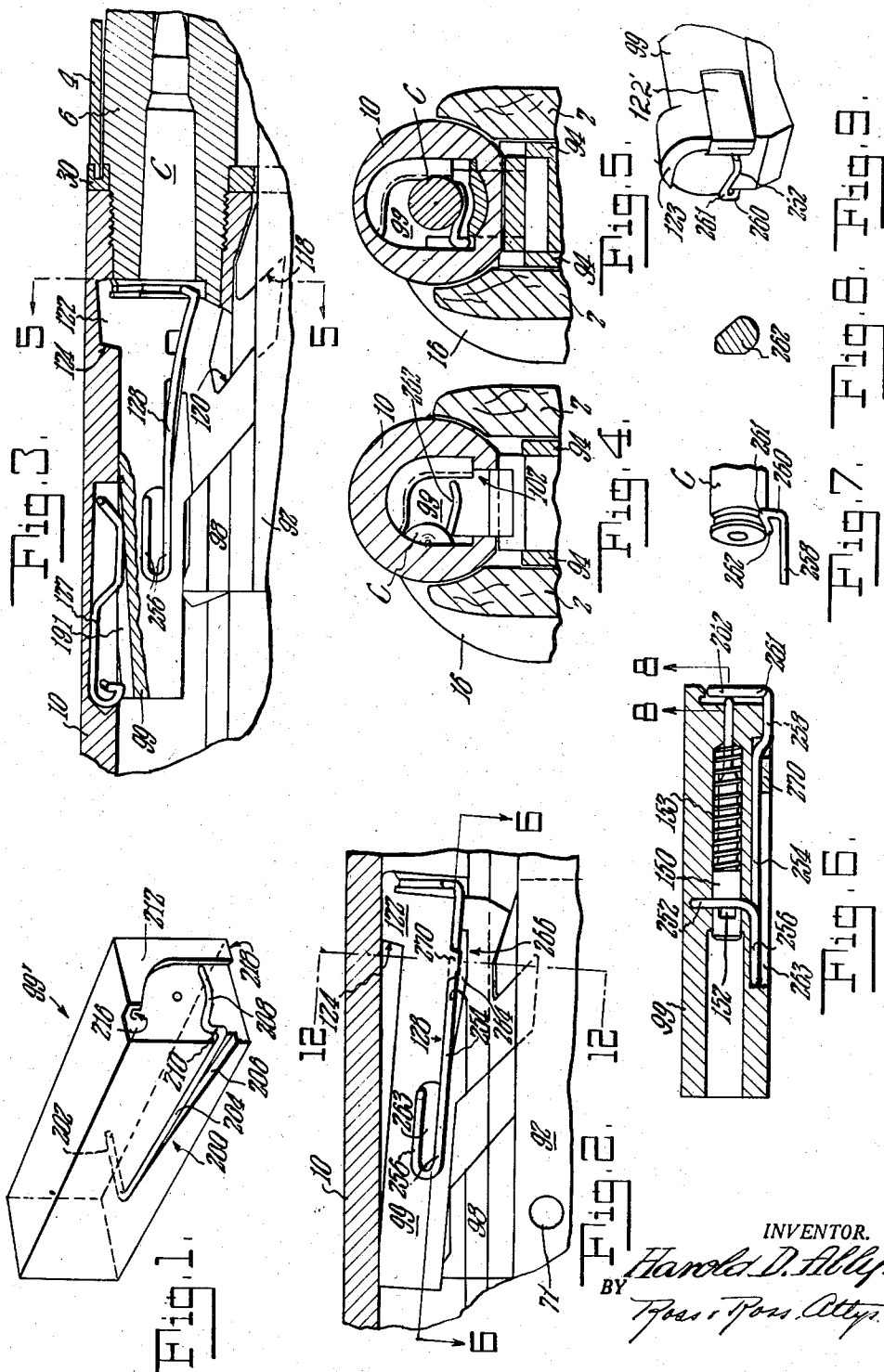
H. D. ALLYN

2,873,546

FIREARM

Filed June 25, 1957

4 Sheets-Sheet 1



INVENTOR.

Handel D. Allyn
By Thomas P. Pons, Attys.

Feb. 17, 1959

H. D. ALLYN
FIREARM

2,873,546

Filed June 25, 1957

4 Sheets-Sheet 3

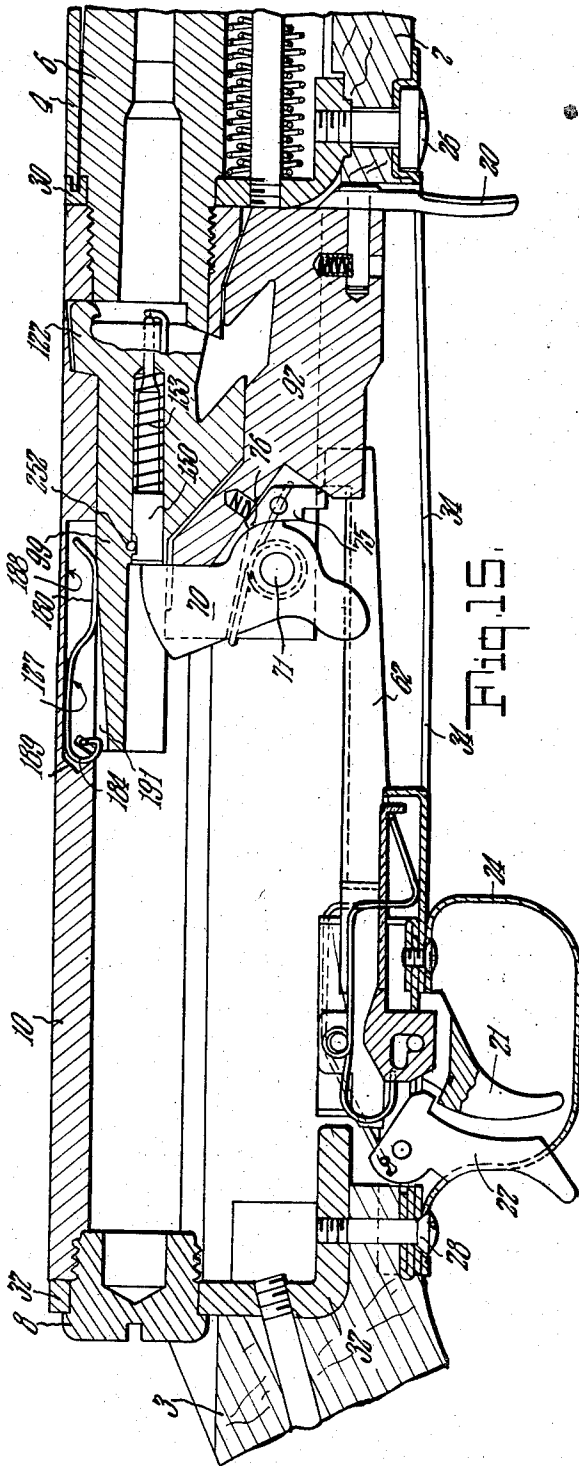


Fig. 15.

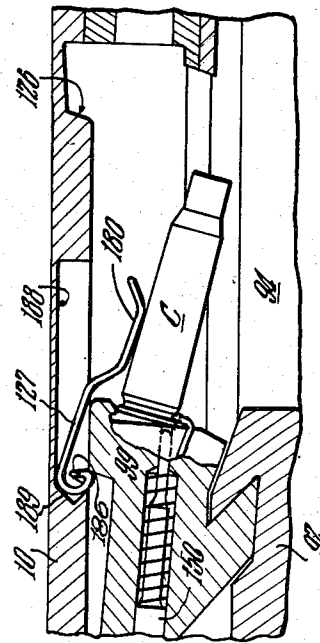
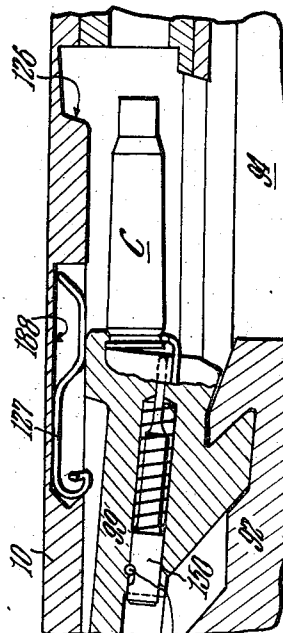


Fig. 17.



Feb. 17, 1959

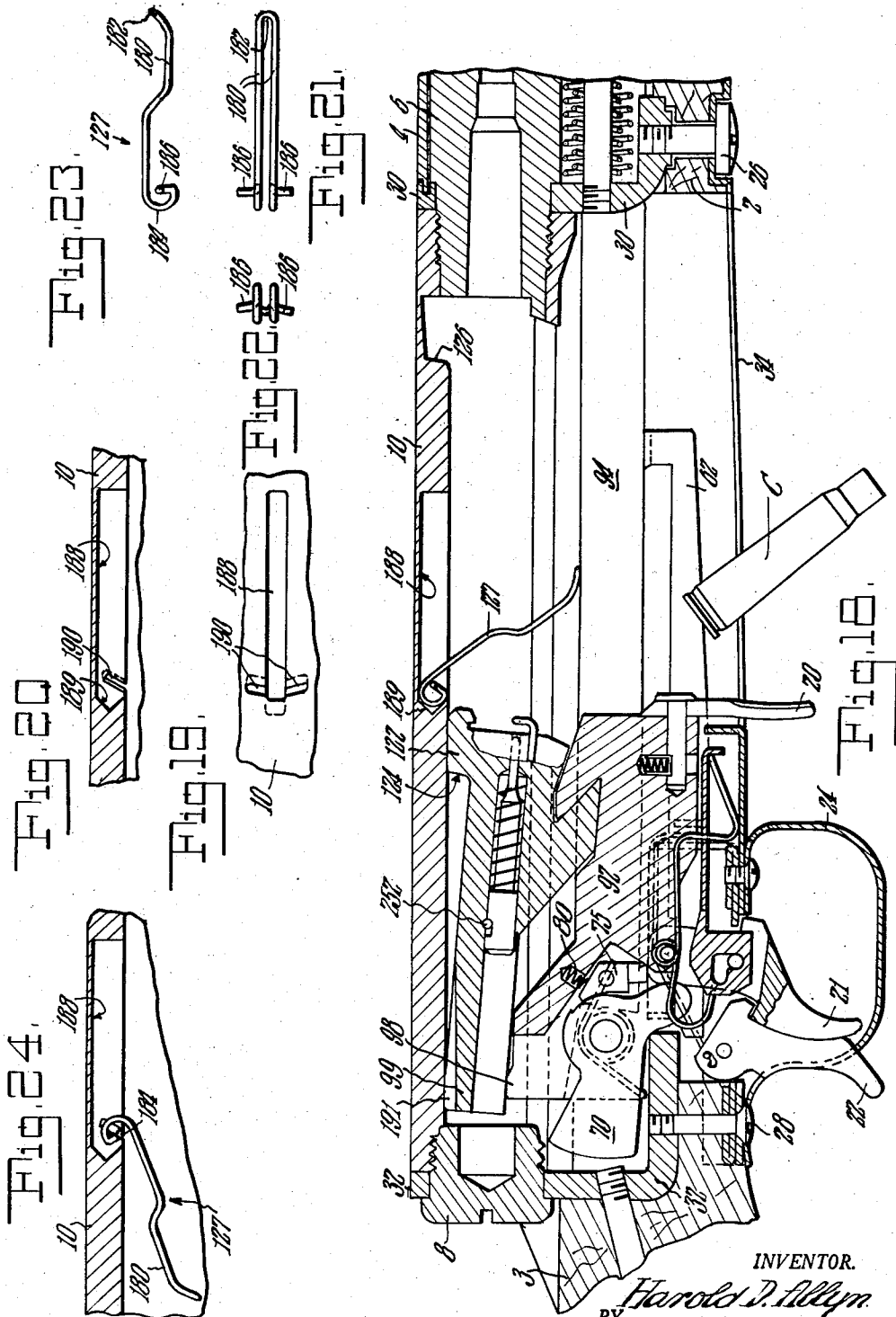
H. D. ALLYN

2,873,546

FIREARM

Filed June 25, 1957

4 Sheets-Sheet 4



INVENTOR.
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1

2,873,546

FIREARM

Harold D. Allyn, Springfield, Mass.

Application June 25, 1957, Serial No. 667,892

8 Claims. (Cl. 42—25)

My invention relates to new and useful improvements in a firearm and is directed particularly to a new and improved cartridge rim retaining mechanism and a means of cartridge ejection.

The concept of the firearm hereof has been made with attendant manufacturing problems being kept fully in mind with special regard being given to the possibility of cheaply producing many of the component parts from riveted or welding stampings, or screw machine parts, or fabrications made by like systems of low cost manufacture, liberal tolerances being permitted so as to aid in the economics of production.

The action hereof is accomplished without the usual multiplicity of associated component parts familiar in firearms of the type herein contemplated.

This invention is a continuation in part of an application filed simultaneously herewith and bearing Ser. No. 667,883 and filing date of June 25, 1957 of the U. S. Patent Office.

Cognate subject matter not claimed herein is embraced in said companion copending application.

It is a specific object of this invention to provide a unitary, single-piece, rim retainer having a capacity for supporting the under side of the rim of a shell or cartridge as same is loaded into or extracted from the chamber of a side-loading, bottom-ejecting firearm.

It is another object hereof to provide a rim retainer which provides its own spring tensioning functions and its own attaching means, and which is of simple design and construction so as to be easily made from spring wire or equivalent material. Being so designed, it is capable of being retained relative to the other components without the use of additional screws, pins or like parts.

Another object is to provide a rim retainer which, in addition to providing a support for the cartridge, provides a backing for the extractor cooperating therewith during certain movements of the firing cycle. The rim retainer is of such configuration as to enable the rim of the cartridge to be easily cleared of the same at the proper predetermined moment and to aid in the prevention of undesired sidewise motion of the cartridge during the loading and/or extracting periods of the firing cycle.

It is still another specific object hereof to provide an improved and simplified one-piece ejector which provides its own spring tension, obviates the necessity of complementing pins and/or screws or the like, eliminates the need for pressing or welding or brazing or the like preparatory to its installation, and is capable of operation without the conventional cuts or slots in the locking lug breech bolt face.

As is well known, ejectors normally include a substantially stationary member in a slot in the face of the breech bolt thereby presenting a surface capable of striking the rear end of the shell and causing same to be ejected from the firearm as the breech block is moved rearwardly.

I eliminate, by means hereof, the necessity of machining the face of the breech bolt with the conventional open-

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ing for the receipt therein of the plunger type ejector and I also eliminate the necessity of slotting the locking lug, both of which operations serve to weaken the respective components.

5 The ejector hereof is located in the top part of the receiver, and the cartridge or shell ejected through the bottom part of the firearm. It will be appreciated however that the location of such features is not to be construed as being necessarily so restricted. That is, the spirit of this invention is to be construed as also including a means of ejection which may be from the side or top of the firearm.

It is also to be emphasized that, whereas the ejector hereof is shown as being particularly operative in a firearm having rim cuts in the front face of the breech bolt, such feature is not particularly necessary for the proper functioning of the ejector component. That is, it may be used on a firearm having the conventional type of extractor.

20 The ejector hereof is preferably made of steel spring wire of a convenient size, according to the size of the shell or cartridge being ejected, although it will further be understood that it may be made of any other suitable or equivalent material.

25 The above and various other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification, wherein like reference characters designate corresponding parts in the several views.

These objects will become apparent as the description proceeds, and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming part hereof.

35 It will be appreciated that the utility and application of the construction hereof extend beyond any one particular kind of firearm and comprehend such new and useful features as may be incorporated in any other reasonably appropriate type of firearm.

40 Further, the invention hereof may be embodied in specific forms other than herein illustrated and disclosed, all without departing from the essential characteristics hereof. Accordingly, limitation of this invention should be made only as determined by a proper interpretation of the terms used in the subjoined claims.

45 The invention resides in the particular arrangement, construction and relationship of the various elements of the firearm as disclosed in the accompanying specification in which the above and other objects of the invention will be apparent.

In the drawings:

Fig. 1 is a perspective view of a simplified version of a breech block showing a rim retainer associated therewith for purposes of illustrating certain fundamental principles of my invention;

55 Fig. 2 is a partial longitudinal sectional view showing the rim retainer associated with a breech block disposed in a rearward position relative to the receiver, the rim retainer being in a position to receive a cartridge from a magazine;

60 Fig. 3 is a partial longitudinal sectional view showing the rim retainer in its downward position, the breech block being in a closed position relative to the receiver, and with a cartridge in the chamber;

65 Fig. 4 is a sectional view on the line 4—4 of Fig. 10.

Fig. 5 is a sectional view on the line 5—5 of Fig. 3;

Fig. 6 is a sectional view on the line 6—6 of Fig. 2 showing the rim retainer and firing pin in place relative thereto;

70 Fig. 7 is a partial perspective view of the forward extremity of the rim retainer in association with the rearward extremity of a cartridge;

Fig. 8 is a sectional view on the line 8—8 of Fig. 6 showing a modified form of the configuration of the shell holding portion of the forward bend of the rim retainer;

Fig. 9 is a partial perspective view of the forward extremity of the breech block showing the forward bend of the rim retainer and a conventional extractor in association therewith;

Fig. 10 is a longitudinal side elevational view of the breech portion of the firearm of the invention;

Fig. 11 is a partial longitudinal side elevational view of the rear end of the barrel and the forward end of the receiver showing the forward extremity of the breech block in the closed position and the rim retainer in a downward cammed position by virtue of the camming action of the camming surface on the rear of the barrel;

Fig. 12 is a sectional view on the line 12—12 of Fig. 2 showing the retaining lug in the breech block;

Fig. 13 is a partial side elevational view of a firing pin and firing pin spring showing the relationship of the rim retainer thereto;

Fig. 14 is a sectional view on the line 14—14 of Fig. 11;

Fig. 15 is a longitudinal sectional view of the breech portion of a firearm showing the ejector of the invention in association therewith, the breech block being in the closed position;

Fig. 16 is a partial longitudinal sectional view of the firearm shown in Fig. 15 and showing a cartridge being withdrawn from the barrel chamber upon the rearward movement of the breech block;

Fig. 17 is a view, similar to Fig. 16, showing the rear of the locking lug of the breech block abutting the ejector, the shell being partially ejected from the firearm;

Fig. 18 is a view, similar to Fig. 15, showing the action of the firearm in the most rearward position thereof, the shell or cartridge having been ejected, with the rim retainer in its normal position in relation to the breech block, and with the ejector in the normal rest position;

Fig. 19 is a partial bottom view of the ejector slot in the receiver;

Fig. 20 is a partial sectional view of a small portion of the receiver, with the ejector removed;

Fig. 21 is a bottom plan view of the ejector;

Fig. 22 is a rear end view of the ejector shown in Fig. 21;

Fig. 23 is a side elevational view of the ejector shown in Fig. 21;

Fig. 24 is a partial sectional view of a small portion of the receiver, with the ejector assembled in its slot in the receiver; and

Fig. 25 is a perspective view of the rear end of the barrel disassembled from the receiver.

In the drawings, I have shown a rifle to which the present invention can be applied to advantage although it will be understood that it can be applied with equal advantage to a shotgun or other type of firearm.

In the following description and claims, various details will be identified by specific names for convenience, which names are intended to be as generic in their application as the art will permit.

Referring now to the drawings more in detail, I have shown in Figs. 10, 15, and 18, the general outline of the midsection or breech portion of a firearm which includes, among other components, the conventional stock 2, stock butt 3, fore-end cover 4, barrel 6, rear cap 8, receiver 10, magazine 16, magazine catch 18, operating handle 20, trigger 21, safety 22, trigger guard 24, front bedding screw 26, rear guard screw 28, front bedding plate 30, buffer plate 32, and stock plate 34.

In Fig. 10, I have shown the stock 2, receiver 10, trigger 21, and magazine 16, and in dash lines, I have shown an uppermost cartridge C in the magazine and a breech block 99 in its rearward position and carrying a rim retainer 128, all for purposes of general orientation.

The receiver 10 is substantially round in cross section,

although not necessarily so, it conceivably being adapted to be rectangular or irregular in cross section, within the spirit hereof.

The bottom of the receiver 10 is cut away and the interior thereof is hollowed for the conventional reception of related components in the well known manner.

The operation of the fire control mechanism which includes the trigger 21, safety 22, connector 62, hammer 70, and sear 75 is shown and described in my co-pending application, filed June 19, 1956 and bearing Serial Number 592,430.

Likewise, the operation and structure of the magazine 16 is described in my other co-pending application, Serial Number 667,924 filed June 25, 1957.

The slide block 92 is centrally hung between a pair of spaced, parallel action bars 94, which bars are attached at their rearward ends to the slide block as by soldering, brazing or equivalent means.

The breech block is of a configuration and dimension complementary to the inside of the receiver 10 and is reciprocal relative thereto.

The slide block is suitably grooved, which grooves are accommodated in a T slot 102 in the receiver 10 whereby lateral and vertical movements are permitted with sufficient clearance being allowed to permit the slide block to reciprocate freely in and relative to the receiver 10.

In operation, the cartridge is fired and the firing cycle is initiated. After the bullet passes the gas vent opening in the barrel 6 (not shown), gas passes therefrom to the piston chamber so as to actuate the piston head all as is conventional and well known. After the inertia of the slide block assembly has been overcome, movement of said assembly rearwardly is brought about thereby.

The slide block assembly initially travels a short pre-travel distance. In the present design, I have provided for as much as 0.5" pre-travel. The pre-travel distance may be varied or controlled as desired. Said pre-travel offers the bullet an opportunity to leave the muzzle whereby the chamber pressure is sufficiently reduced so as to facilitate easy extraction.

Following said pre-travel, the cam face 118 of the slide block 92 contacts the cam face 120 of the breech block 99 where it forces the locking lug 122 of the breech block 99 downwardly thereby causing the locking lug surface 124 of the breech block 99 to become disengaged from the mating locking surface 126 of the receiver 10.

The slide block assembly then travels rearwardly in the conventional manner by means of the force imparted to the front end of the piston by the gas resulting from the explosion of the cartridge.

During this period of rearward travel, the cartridge is ejected by the ejector 127.

In Fig. 1, I have shown, in perspective and for purposes of illustration only, the basic features or principles of a rim retainer. Same is a simplified version of a breech block showing a rim retainer associated therewith for purposes of illustrating certain fundamental principles of design.

Said rim retainer is generally designated by the numeral 200 and is shown in combination with a rectangular shaped breech block generally designated by the numeral 99'.

The rearmost extremity 202 of the rim retainer is a portion which is bent to extend transversely of the longitudinally extending axis of the rim retainer and to be receivable in an appropriately aligned opening extending into the breech block from one side thereof, as shown.

Said extremity or bend 202 is connected to one end of an elongated mid-section 204 of the rim retainer, which is receivable in a tapered slot 206 in the side of the breech block, the slot being of greater height at its forward extremity than at its rearward extremity so as to permit vertical flexing movements of the mid-section 204 and of the forward transversely extending bend 208 of the rim retainer relative to the bend 202 and the

breech block. The bend 208 is connected to said mid-section 204 by means of an offset 210, as shown.

The forward face of the breech block 99' is slotted, as shown, to provide a rim cut, same being undercut to form a lip 212 providing a means for receiving the rim of a cartridge.

The rim cut is formed on a radius about the longitudinal center line of the breech block through substantially a quarter circle having a substantially horizontally disposed entrance 216 and a substantially vertically disposed outlet 218.

Whereas the rim retainer shown in Fig. 1 is illustrated as being a right hand rim retainer, it will be appreciated that a left hand rim retainer may be used equally effectively with the magazine being placed on the opposite side of the receiver.

Further by way of general orientation, it appears desirable to explain that, in a conventional firearm of the detachable box magazine type, the loaded magazine is placed in the firearm through an opening in the bottom of the receiver immediately rearwardly of the chamber.

The breech block is then moved forwardly to load the weapon. It strips off the uppermost cartridge in the magazine and pushes same forwardly. When the cartridge has moved forwardly sufficiently to clear the magazine ears, the magazine spring, which is exerting a tension on the magazine follower, moves the cartridge upwardly whereupon the rear or rim of the cartridge snaps up under the extractor and the rim support of the breech block. The spring tension of the extractor or extractors hold the rear end or rim of the cartridge in place in the breech block while the cartridge is being loaded. It functions similarly while the breech block is reciprocating rearwardly and the cartridge is being extracted.

Likewise in the conventional firearm of the aforementioned type, at or near the termination of the rearward movement of the breech block, the ejector throws the shell or cartridge from an opening in the top or at the side of the firearm.

In firearms of the type envisioned herein, where loading is from the side thereof and ejection is from the bottom thereof, it is essential that a support be provided underneath the rear or rim of the cartridge during the forward loading and rearward extracting movements. If the front end of the breech bolt is in the form of a locking lug which is raised into a locking position in a corresponding slot in the top front of the receiver immediately to the rear of the chamber, a flexible support must be provided since the rim of the cartridge remains stationary vertically while the locking lug is forced upwardly to lock the piece. The invention hereof is directed to that end.

In Fig. 2, the rim retainer of the invention is illustrated in association with a breech block 99 and other related components and is generally designated by the numeral 128.

The rim retainer 128 comprises a rearward transversely extending bend 252 (best shown in Fig. 6).

The elongated mid-section 254 of the rim retainer has a rearward extremity 256 doubled upon itself and connecting at one end with the rearward bend 252.

The forward end portion 258 of the mid-section is offset and the outer free end thereof connects through another offset 260 to a forward transversely extending bend 262 of the rim retainer.

The rearmost bend 252 is receivable in an appropriately aligned opening extending transversely into the breech block 99 from one side thereof.

The doubled rear end 256 of the elongated mid-section 254 is snugly receivable in a widened recess or slot 263 in the side of the breech block 99 and the forward end thereof is loosely receivable in a tapered recess or slot 264. That is, the recess 264 is wedge shaped (as shown) and tapers outwardly and downwardly toward the front end thereof whereby vertical flexing movement of the

midsection and forward bend of the rim retainer is facilitated.

The foremost bend 262 of the rim retainer is disposed forwardly of the forward face of the breech block.

As shown in Fig. 2, the mid-section 254 is nested at the top of the tapering slot 264 and the enlarged mouth of the tapered recess is generally indicated by the numeral 266.

It will be appreciated that, in Fig. 2, the rim retainer, is in an uppermost position insofar as the vertical flexing motion thereof is concerned, same being held in such position by the spring tension provided by the mid-section 254 of the rim retainer and the snug fit of the loop portion 256 in the recess 263 in the breech block.

Such flexing motion ensues, it might be here explained, when the locking lug 122 of the breech block 99 is urged upwardly into the receiver 10 by the camming action of the slide block as it moves forwardly and in said movement is brought to bear upon the cam of the breech block whereby the locking lug is urged into the complementary locking lug cut in the upper wall of the receiver 10, as defined by the locking surface 126 of the receiver 10, all to the end that the firearm is locked.

Such locked position is best shown in Fig. 3 wherein will be observed the locking lug 122 disposed in the locking lug cut in the receiver 10 and the breech bolt 99 in its most upward forward locked position relative to the barrel 6 which is threadedly engaged with the fore part of the receiver 10.

Also shown in Figure 3, but not forming a part of this invention, is a fore end cover plate 4 covering the top of the barrel 6.

Further illustrated in Fig. 3 is the downward position of the forward end of the rim retainer 128, same resulting from an action hereinafter to be illustrated and described.

Attention is additionally called to the showing of a cartridge C in the chamber of the barrel 6 with the forward bend 262 of the rim retainer 128 embracing the lower portion of the rim of the cartridge.

Reference is now made to Fig. 6 showing the rear bend 252 of the rim retainer disposed within the transverse opening through the breech block 99. Said bend 252 functions as a retainer for the firing pin 150 receivable in a firing pin opening extending longitudinally through the breech block. The firing pin 150 is provided with a flattened inset 152 on its upper peripheral surface, as shown, whereby the reciprocating movement of the firing pin is limited. A firing pin spring 153 encloses the firing pin in the well known manner.

The relationship of the rear bend 252 of the rim retainer, the firing pin 150, and the firing pin spring 153 is shown in detail in Fig. 13.

When the breech block 99 is disposed within the receiver 10, the rim retainer 128 is held in place by the inner side wall of the receiver 10 as the breech block is in the closed or locked position, all as may be observed by reference to Fig. 5.

When the breech block is moved rearwardly a short distance, the forward end of the breech block passes the front portion of the magazine cut in the receiver.

With the magazine 16 removed from the receiver and with the receiver cut away at the magazine cut, the inner side wall of the receiver no longer holds the rim retainer in position.

Except when the breech block is in its most forward position and the front end thereof is in its most upward position, the rim retainer is in the "up" position relative to the breech block and, in such position, the offset portion 258 of the mid-section 254 of the rim retainer is held underneath a retaining lug 270 cut in the breech block. This feature may best be observed by reference to Figs. 2 or 12.

As will be appreciated by reference to Figs. 4 and 5, the forward face of the breech block 99 is provided with

a rim cut, same being undercut to form a lip as in the case of the form of breech block shown in Fig. 1. The rim cut is formed on a radius about the longitudinal center line of the breech block through substantially a quarter circle having a substantially horizontal entrance and a substantially vertical outlet.

In Figs. 4 and 5, a detachable side loading box magazine 16 is also shown.

In Fig. 4, the rim of the uppermost cartridge C in the magazine projects into the receiver and is ready to be stripped from the magazine by the forward moving breech block and urged into the chamber of the firearm in the conventional manner.

In Fig. 4, the rim contact portion 262 of the rim retainer 128 is so disposed that it will exert an upward pressure upon the cartridge when the upper portion of the rim thereof is in the rim cut of the breech block 99 and the rim contact portion 262 is in the cannular of the shell.

As the breech block 99 is reciprocated forwardly, the face of the breech block contacts the extreme rear of the rim of the cartridge which protrudes the magazine in the well known manner.

Thereafter, the cartridge is moved forwardly with the breech block.

The rear portion of the cartridge C is retained in the magazine 16 by the magazine ear 330, as shown in Fig. 10, until the cartridge is moved sufficiently forward to place the bullet portion thereof well into the firearm chamber.

At such time, the rear of the cartridge has cleared the magazine ear and the entire rear of the cartridge jumps outwardly toward the center of the receiver due to the tension of the magazine spring on the magazine follower.

Thereupon the rim cannular of the cartridge contacts the retaining hump 261 of the rim retainer 128.

The upward force of the magazine spring is sufficient to overcome the spring tension on the rim retainer 128 and the cannular of the cartridge slides over the retaining hump, the rear of the rim clearing the rim clearance bend 260 of the rim retainer.

With continued forward movement of the breech block, the rear of the rim of the cartridge moves beneath the rim cuts of the breech block.

Still further forward movement of the breech block finalizes the seating of the rear of the rim of the cartridge beneath the rim cuts of the breech block with the rim contact portion of the rim retainer in the cannular of the cartridge and holding the top of the cartridge against the uppermost portion of the rim cuts of the breech block.

In Fig. 7, I have illustrated the rim contact portion of the rim retainer 128 in the lower portion of the cartridge shell cannular, all other parts of the firearm having been removed for purposes of simplification.

The concave shape of the forward bend of the rim retainer 128, and the rim retainer hump 261, as best illustrated in Figs. 4 and 5, serves to hold the cartridge C from moving sideways to the left (as viewed in said figures). The rim cuts prevent the cartridge from moving sideways to the right.

When the breech block is fully closed, the locking lug portion 124 has moved up into the locking lug cut in the receiver 10 and the arm 254 of the rim retainer 128 flexes as previously mentioned.

Upon discharge of the firearm, the breech block 99 is moved to the rear.

As above described, it is necessary either to work a cartridge through the magazine or to place manually the cannular of the cartridge on the rim contact portion of the rim retainer while at the same time placing the rim cannular in the rim cuts of the breech block in order to place a cartridge in the chamber and to lock the breech block of the firearm.

If desired to place a cartridge in the chamber without

working same through the magazine or without placing it in the rim cuts of the breech block, an extractor 122' may be fitted into the breech block 99 and the rim cuts may be eliminated (in part or in whole) or may be replaced by a rim support 123, as shown in Fig. 9, in which instance the rim contact portion 262 of the rim retainer 128 may be formed, as shown in Fig. 8, so that it will snap over the rim of the cartridge which is placed in the chamber prior to the closing of the breech block. It is to be here stressed that in any instance, the rim retainer does not replace the extractor.

Otherwise if desired, the lower side of the rear of the barrel 6 may be provided with a cam surface 7 which may function to cam the rim retainer 128 slightly downwardly so as to allow same to clear the rim of a cartridge, as shown in Figs. 11, 14 and 25, the surface 14 being used as a cartridge feed ramp for the point of the cartridge.

When the firearm is opened, the extractor pulls the cartridge from the chamber and the rim contact portion of the rim retainer sets in the cannular so as to prevent the rear of the cartridge from dropping from the extractor. The retaining hump 261 prevents the extractor from forcing the cartridge sidewise, the retaining hump 261 acting as a backing for the extractor.

In Fig. 15, the components are shown in the discharged position.

The slide block 92 includes an upwardly extending cam portion on the upper surface thereof which contacts a mating cam surface in the breech block mechanism so as to force same downwardly and to move it out of its closed position in the receiver, to unlock the firearm, and to allow the breech block to move rearwardly.

The hammer 70 is pivotally mounted on a hammer pivot pin 71 extending laterally between and supported by the spaced action bars 94 and slide block 92. The hammer is hung on its pivot within a slot in the mid-section of the slide block disposed between the action bars and at the rear ends thereof.

The hammer 70 and sear 75 and their associated spring members are mounted in the slide block and are supported by means of a pair of suitably spaced action bars so as to permit their reciprocation with the breech bolt of the firearm during the conventional operation thereof.

The relative operations of the breech block 99, slide block 92 and action bars 94 are as shown and described in my copending application, Ser. No. 566,267, filed Feb. 17, 1956. Inasmuch as same does not form a part of this invention it will not be described herein in detail.

Generally, the hammer is held under the tension of and actuated by a generally U shaped hammer spring which is of the mousetrap or torsion type.

Opposite side arm portions of the hammer spring are looped centrally thereof, the loops passing around the hammer pivot pin on both sides of the hammer so that the hammer spring is mounted around the hammer pivot pin. The spaced opposite lower free ends of the hammer spring may be bent outwardly and bear upwardly against the slide block, as shown. A transversely extending mid section of the hammer spring bears upwardly against the rearmost face of the hammer, also as shown, all to the end that the upper portion of the hammer is swung upwardly and forwardly upon the hammer pivot pin when the hammer is released.

The sear 75 is pivotally mounted on a sear pin which extends laterally through the slide block and between the spaced action bars on the opposite sides thereof and functions to hold the hammer in the cocked position and to prevent the swing or throw thereof until released by the actuation of the trigger 21.

The sear is provided with an uppermost hammer engaging point 76 which engages a complementary and mating sear engaging notch in the hammer.

The hammer is held relative to the sear through the hammer engaging point 76 engaging the sear engaging

notch by virtue of the tension exerted by a sear spring 80 which nests in an appropriately spaced opening in the slide block and exerts a normally downward or outward pressure against the sear.

A generally U shaped elongated connector 62 has spaced parallel upwardly extending side walls connected by a lower horizontally disposed bottom wall.

The connector is movable forwardly and rearwardly between an upper and forward position to a lower and rearward position by means of its relationship with the trigger.

As the connector is pulled rearwardly upon rearward movement of the trigger, the sear is moved clockwise and the sear spring is compressed inwardly into its opening in the slide block whereby the hammer engaging point of the sear is released from engagement with the sear engaging notch in the hammer so as to permit the hammer to fall against the firing pin and thus to discharge the firearm.

The ejector hereof is generally designated by the numeral 127 and comprises a unitary member which is self-retaining within the receiver 10, as will be observed. It has the capability of inducing the ejection of the fired or unfired shell or cartridge from the piece by striking the same on the upper side thereof and forcing it out of the extractor means and subsequently out of the receiver.

The ejector provides its own spring tension and its own attaching means, all as will be observed hereinafter.

Further, it is actuated by the breech block so as to necessitate no slots or other openings in the locking lug and/or in the face of the breech block.

The ejector is generally U shaped in cross section from a single piece of wire doubled upon itself to include a pair of spaced parallel side portions which together form what will be identified as an operating section 180.

The forward opposite ends of the parallel portions of the operating section 180 are connected together by a transverse connecting section 182.

The rearward opposite ends of the parallel portion of the operating section 180 are looped at 184 and have free outer ends extending outwardly as ears 186 which are transverse to the longitudinal axis of the ejector.

The inner wall of the receiver is provided with an elongated groove as at 188 for the reception of the ejector therewithin, said groove having angularly disposed slots 190 on the opposite sides thereof extending transversely therefrom and communicating therewith. The slots 190 are adapted to receive the ears 186 of the ejector 127.

The rear end of the breech block 99 is provided with an elongated slot 191 which slot communicates with the elongated groove 188 in the receiver for purposes subsequently to be referred to.

As the breech block moves rearwardly to the position shown in Fig. 17, the locking lug 122 strikes the looped portions 184 of the ejector 127 so that they pivot relative to the notched rear wall of the groove 188 and the ejector ears 186 pivot in their respective slots 190, resulting in the downward forcing of the operating section 180 thereof. A portion of said operating section 180 is offset and is of such configuration and design that it is brought to bear upon the shell or cartridge C.

Continued movement rearwardly of the breech block permits continued movement downwardly of the operating section 180 of the ejector so as to bring about the ejection of the shell from the gun, as shown in Fig. 18, the ejector having forced the rim retainer downwardly against the spring of the rim retainer sufficiently to enable the upper portion of the rim of the shell to be forced out of the rim cuts in the breech block.

The angle of the slots 190, shown in Figs. 19 and 20, in the receiver wall is such that that spring tension is provided by the ejector itself so as to retain the ejector in its normal or rest position shown in Fig. 18. The ejector

so remains unless and until forcibly held in another position, such as shown in Fig. 24, or the action is closed, as shown in Fig. 15.

With the ejector in this normal or rest position, the lowermost plane of the looped portions 184 is disposed within or at least flush with the groove 188 of the receiver so that the breech block is free to move forwardly upon its return stroke, without contacting said looped portions.

Continued forward movement of the breech block results in its contact with the operating section of the ejector so as to return the ejector to its compressed position within the groove, as shown in Fig. 15, in preparation for a repeat cycle of the operation.

As the breech block moves forwardly to the position assumed in Fig. 15, the longitudinal slot 191 in the breech block is of such dimension as to provide a clearance for the projecting end of the looped portions of the ejector to clear the breech block.

It will be observed that the lower portion of the notched rear wall 189 of the groove 188 and the angular slots in the receiver wall are so arranged relative to each other that the ears of the ejector are retained in the respective angular slots by the lower portions of the looped portions 184 of the ejector bearing upon the lower portion of the notched rear wall.

To remove the ejector from the receiver, the rear cap is removed and the receiver is removed from the stock whereby the breech block may be removed from the receiver. The operating section of the ejector is then rotated sufficiently rearwardly (to the approximate position shown in Fig. 24) as to permit the removal of the ejector from the receiver.

The ejector may be assembled to the receiver by reversing the procedure of the preceding paragraph.

In Fig. 18, the breech block is shown in its rearmost position and the ejector is shown at rest as aforesaid. If the front end of the ejector is manually moved rearwardly, it will strike the front end of the breech block or the front end of the slide block but will not rotate sufficiently to the rear as to permit its removal from the receiver.

Although particular embodiments of my invention have been described, it will be understood by those skilled in the art that the object of the invention may be attained by use of constructions different in certain respects from those disclosed without departing from the underlying principles of the invention.

I therefore desire by the following claims to include within the scope of my invention all such variations and modifications by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

Having thus described by invention, what I claim is:

1. In a firearm having a barrel and receiver and breech bolt reciprocable in the receiver and a rim retainer mounted in the breech bolt and being engageable with the rim of a shell for supporting the shell relative to the barrel, the improvement in a self-retaining ejector comprising, an elongated spring-like wire member bent intermediate its ends in the form of a horizontally disposed U having rearward free extremities in the form of transversely extending ears pivotally receivable in complementary slots in the receiver, the U portion of said wire member defining a finger extending from the points of pivotal engagement with the receiver forwardly and inwardly toward the center of the receiver in position for yieldingly pressing downwardly onto the breech bolt as the breech bolt is in the forward position and for resilient engagement with the outer circumference of a shell being extracted from the barrel and being engaged by the rim retainer as the breech bolt is moved rearwardly thereby to yieldingly deflect the extracted shell from the receiver.

2. In the ejector as set forth in claim 1, the improve-

ment comprising, the finger of said spring wire member being bent sharply to define an abruptly inturned yieldable abutment extending inwardly away from the wall of the receiver and held upwardly by the top surface of the breech bolt as the breech bolt moves to its rearmost position and arranged for engagement forwardly of the shell engaging face of the breech bolt with the outer circumference of the shell for inducing the ejection of the fired shell from the receiver.

3. In the ejector as set forth in claim 1, the improvement comprising, the ears of said spring-like wire member being rotatable upon contact with the locking lug of the breech block as the breech block reciprocates rearwardly from its foremost position relative to the receiver for actuating the finger of said spring wire member downwardly.

4. In the ejector as set forth in claim 1, the improvement comprising, said spring-like wire member being cammable upwardly as the breech bolt reciprocates forwardly from its rearmost position relative to the receiver.

5. In a firearm having a barrel and receiver and breech bolt reciprocable in the receiver and an ejector mounted in the receiver and being engageable with the circumference of the shell for ejecting the shell from the receiver, the improvement in a unitary cartridge rim retaining mechanism for supporting the lower side of the rim of a cartridge during the loading into and extraction from the barrel chamber comprising, an elongated spring-like member having an intermediate portion extending lengthwise of the longitudinal axis of the breech bolt and having rearmost and foremost transversely extending bends connected to the intermediate portion at opposite ends thereof, the rearmost bend being receivable in a complemental opening in the breech block, the intermediate portion being receivable in a tapered slot in a side wall of the breech block permitting vertical flexing movement of the forward extremity of the intermediate portion relative to the breech block, and the foremost bend being disposed forwardly of the shell engaging face of the breech bolt and having a configuration complementing the lowermost portion of the rim of the cartridge being supported thereby.

6. In a firearm having a barrel and receiver and breech bolt reciprocable in the receiver and an ejector mounted in the receiver and being engageable with the circumference of the shell for ejecting the shell from the receiver, the improvement in a unitary cartridge rim retaining mechanism for supporting the lower side of the rim of a cartridge during the loading into and extraction from the barrel chamber comprising, an elongated spring-like

member having an intermediate portion extending lengthwise of the longitudinal axis of the breech bolt and rearmost and foremost transversely extending bends connected to the intermediate portion at opposite ends thereof, the rearmost bend being receivable in a complemental opening in the breech block, the foremost bend being disposed forwardly of the shell engaging face of the breech bolt and having a configuration complementing the lower side of the rim of the cartridge being supported.

7. In a firearm having a barrel and receiver and breech bolt reciprocable in the receiver and a shell extractor mounted in the breech bolt and being engageable with the rim of a chambered shell for extracting the shell from the barrel and an ejector mounted in the receiver and being engageable with the circumference of the shell for ejecting the shell from the receiver, the improvement in a unitary cartridge rim retaining mechanism for supporting the lower side of the rim of a cartridge during the loading into and extraction from the barrel chamber and for backing the extractor during the extraction comprising, an elongated spring-like member having an intermediate portion extending lengthwise of the longitudinal axis of the breech bolt and rearmost and foremost portions connected to the intermediate portion at opposite ends thereof, the rearmost portion being pivoted to the breech block, the intermediate portion being flexible vertically relative to the breech block, and the foremost portion being disposed forwardly of the shell engaging face of the breech bolt and having a configuration complementing the lower side of the rim of the supported cartridge and facilitating movement thereof during the loading and extracting movements.

8. In the rim retaining mechanism as set forth in claim 7, with a firing pin being receivable within the breech bolt, the improvement comprising, the rearmost bend of said spring like member overlying the firing pin within the breech bolt for holding the firing pin in place.

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