Oct. 11, 1949. C. H. BENSON 2,484,444

CARTRIDGE EJECTOR FOR FIREARMS

Filed April 14, 1945

Fig. 1.

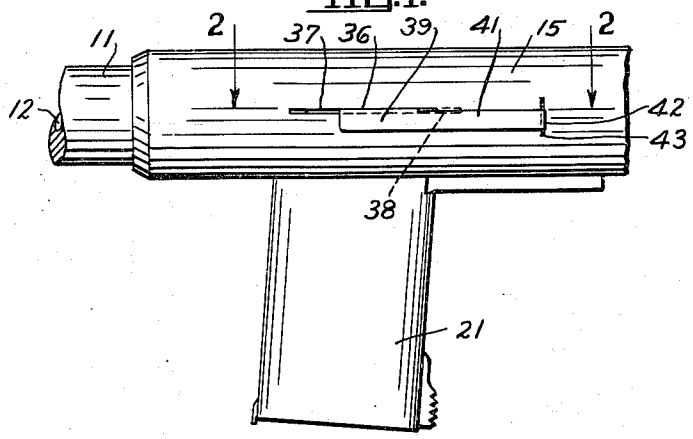


Fig. 2.

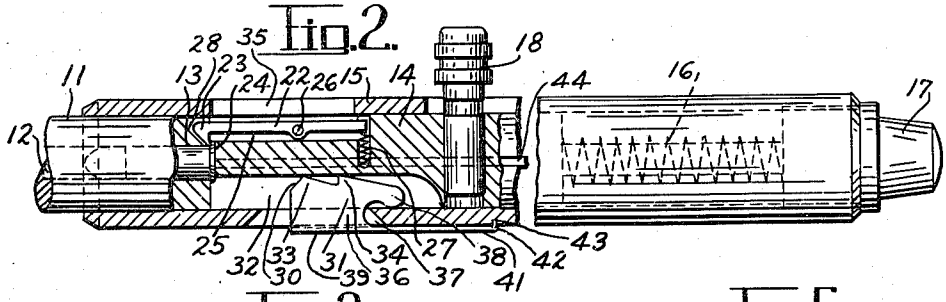


Fig. 3.

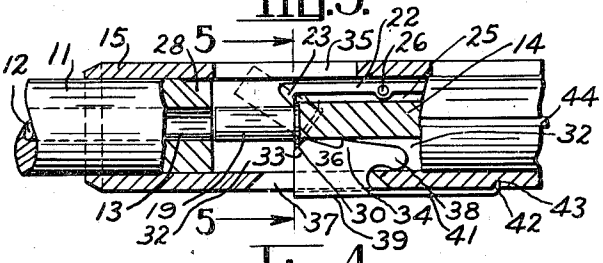


Fig. 5.

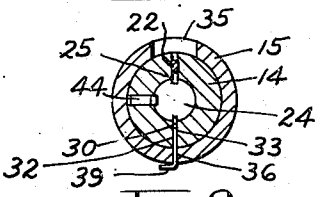


Fig. 4.

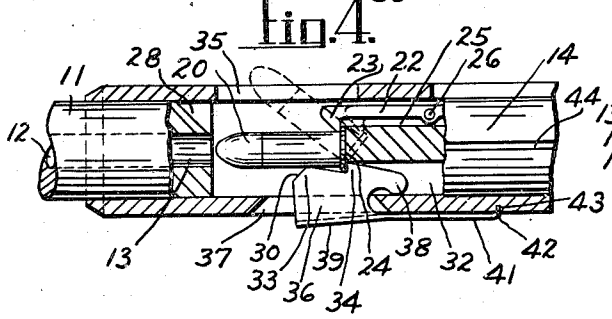
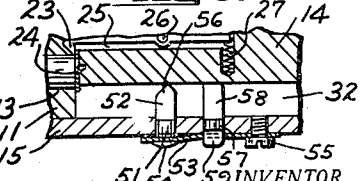


Fig. 6.



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CARTRIDGE EJECTOR FOR FIREARMS

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14 Claims. (Cl. 42—25)

1

The invention relates to improvements in firearms and more particularly to an improved cartridge and cartridge shell ejector for firearms.

In firearms, especially of the small arms type, it is often desirable to eject loaded cartridges from the chamber in the barrel as well as to eject empty cartridge shells therefrom. When the firearm is one of the semi-automatic, or one of the full automatic models, where speed of ejection is particularly required for efficient operation thereof, it is very desirable that the ejecting means be one capable of automatically ejecting either loaded cartridges or empty cartridge shells with substantially equal speed.

To obtain the desirable advantages, above referred to, it is one of the objects of this invention to provide in a firearm an ejector adapted to eject automatically either loaded cartridges, or empty cartridge shells, at substantially equal speed.

Another object is to provide in a firearm an ejector adapted for such a purpose without the necessity of manipulation to convert it, or to adjust it, to make it capable of ejecting either loaded cartridges or empty cartridge shells.

A further object of this invention is to provide an improved ejector for a firearm which is adapted to be readily detached from, or attached to, the firearm.

A still further object is to provide an improved firearm having an ejector which will be relatively inexpensive to manufacture, simple in construction, practical, and very efficient and durable in use.

With these and other objects in view, which will appear as the description proceeds, there have been illustrated in the accompanying drawings, two forms in which the invention may be embodied in practice.

In the drawings:

Fig. 1 is a side view of the assembled operative parts of a firearm embodying the features and principles of this invention, the barrel being shown broken off and the stock being omitted for the sake of clearness;

Figure 2 is a longitudinal sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a similar sectional view to that shown in Figure 2 but with the operating parts in position when ejecting an empty shell;

Figure 4 is a sectional view similar to those shown in Figures 2 and 3 but with the operating parts in position when ejecting a loaded cartridge;

2

Figure 5 is a cross-sectional view taken on line 5—5 of Figure 3; and

Figure 6 is a cross-sectional view showing a somewhat modified form of ejector mechanism.

Referring now to the drawings wherein like reference numerals designate like parts throughout the several views the numeral 11 denotes a barrel having a bore 12, generally provided with a cartridge is adapted to be seated by the action of a reciprocable bolt 14 slidably mounted in a receiver 15 to the front end of which the barrel 11 is secured. As in most semi-or full automatic firearms, the bolt 14 is urged into battery position by a coiled spring 16 reacting between the bolt 14 and a stationary receiver part, such as a receiver cap, or head, 17. An operating member, either a lever, or a stud, 18 is provided, whereby the bolt 14 may be manually drawn back to initially cock the firearm, or to eject an empty cartridge shell 19, or a loaded cartridge 20 should the gun action jam, or stop firing, due to defective ammunition. A magazine 21 of known structure is shown extending downwardly from the receiver 15 and being in position to have a cartridge engaged and fed therefrom by the bolt 14 into the chamber 13 in the usual and well-known manner, when the bolt 14 is moved forwardly by the spring 16.

A cartridge or shell extractor 22 is also provided and is of the conventional form having a hook end 23 adapted to engage the cartridge shell 19 in front of the head thereof. The extractor is carried by the bolt 14, in this instance with its hook end 23 overlying the cartridge head seat 24 formed in the bolt end. The extractor 22 illustrated is disposed in a groove 25 formed in the bolt 14 and is pivoted therein intermediate its ends on a pin 26. A coiled spring 27 reacting between the rear end of the extractor 22 and the bolt 14 constantly urges the hook end 23 into cartridge head engaging position. A notch 28 is usually provided in the rear end of the barrel to allow free lateral movement of the hook end 23.

The improved ejector of this invention comprises a laterally movable cartridge head engaging member 31 extending into a slot 32 provided in the bolt 14 to receive it. The cartridge engaging member is adapted to be held relatively stationary in respect to the bolt 14 by being secured to the receiver 15. The slot 32 in the bolt 14 extends lengthwise thereof a sufficient amount to insure that the member 31 will be free of possible engagement with the bolt 14. The member 31 is provided with two pointed stop members 33 and 34 spaced apart lengthwise in

respect to the firearm and lying in the path of movement taken by a loaded cartridge 20 and an empty cartridge shell 19 as they are extracted from the chamber 13. The inner forward end of the forward pointed stop member 33 is broken by being inclined downwardly and forwardly, or rounded, as at 30, and is provided to be particularly engaged by an empty shell as it is extracted from the chamber 13 by the extractor 22 and cause it to be ejected through an opening 35 provided in the receiver 15 for this purpose. The inclined surface 30 on the pointed stop member 33, due to its form, permits the passage of the head of a loaded cartridge 20, the bullet of which is still in the chamber 13, into engagement with the pointed stop member 34 whereby the loaded cartridge 20 will be ejected through the opening 35. The member 34 presents an abrupt forwardly directed shoulder against which the head of the loaded cartridge is engaged.

The ejector 31 illustrated in Figures 1–5 inclusive is made of sheet metal, preferably spring steel, tempered to give it the desired tension. The pointed members 33 and 34 are formed along the edge of a plate portion 36 which extends through a slot 37 provided in the receiver 15 and into the slot 32 in the bolt 14. The plate portion 36 extends beyond the rear end of the slot 37 in the form of a circular-ended tongue 38 which engages against the inside surface of the receiver 15 and acts as a pivot upon which the front portion of the ejector plate portion 36 may swing when a cartridge is extracted from the barrel.

A flat flange 39 extends along the outer edge of the plate portion 36 and is substantially at right angles thereto to overlie the outside of the receiver 15. The flange 39 extends beyond the rear end of the slot 37 in the receiver in the form of a leaf spring portion 41 and has its rear end 42 bent inwardly into a transverse slot 43 provided in the exterior of the receiver 15 to receive the same. The leaf spring portion 41 of the flange 39 is spring-tensioned to constantly urge the plate portion 36 inwardly toward the axis of the firearm and to tend to swing the plate portion 36 in a direction to cause the tongue 38 to tightly engage the receiver whereby, due to this action, and the engagement of the rear end 42 with the receiver 15 in the slot 43, the ejector is releasably locked in position.

In the modified form shown in Figure 6 a pin 51 having a flattened end 52 to be extended into the slot 32 in the bolt 14 extends through the receiver 15 under the urge of a leaf spring 53 to which it is fastened as by riveting its outer end 54 to one end of the spring. The other end of the leaf spring 53 is secured to the receiver as by a screw 55. The inner end of the pin 51 is rounded as at 56 to act upon a cartridge shell 19 in a manner similar to the action of the point 33 of the ejector illustrated in Figures 1–5 inclusive. Another pin 57 extends through the receiver 15 and has a flattened inner end 58 extending into the slot 32 in the bolt 14. The pin 57 may be secured to the receiver or be, as shown, maintained in place by having a flattened outer end 59 extended through the spring 53 to be supported by this spring. As in the previously described form the forwardly disposed pin 51 will eject an empty cartridge and the rearwardly disposed pin 57 will eject a loaded cartridge.

It will be obvious that in both forms the forwardly disposed pointed member 33, or the pin end 56, being in engagement with the loaded cartridge and under the urge of the respective leaf springs 41 and 53 will impose upon the cartridge an added impulse to rapidly eject it from the receiver. This added impulse insures that the cartridge, which is heavier and longer than the empty shell, will be ejected more rapidly than the empty shell so that there will be no danger of the cartridge not being properly ejected and thus interfering with the action of the firearm.

A firearm provided with the above disclosed improved ejector mechanism operates more smoothly and efficiently to eject empty cartridge shells or loaded cartridges. The bolt 14 when initially moved into battery position removes a cartridge from the magazine and disposes it into the cartridge chamber 13 whereupon by the release of suitable firing mechanism (not shown) the firing pin 44 is released to fire the cartridge. The recoil action, due to firing the cartridge, will drive the bolt 14 rearwardly and the empty shell from the chamber 13. When the head of the cartridge shell, due to its rearward movement, by manual retraction of the bolt or by recoil action, engages the pointed stop member 33 of the ejector member 31, it is tilted toward the receiver opening 35 and rapidly snapped through this opening and ejected from the receiver 15. This action is for the most part due to the cooperating action of the extractor hook 23 and the pointed member 33, or the pin 51 of the form shown in Figure 6, on the shell but, due to the spring action of the leaf spring 41, or the spring 53, an added urge is imposed upon the shell to move it outwardly.

The action above described will also take place if and when the bolt 14 is retracted manually by use of the bolt retracting lever, or stud 18. By manually retracting the bolt 14 a loaded cartridge, desired to be ejected, will be drawn rearwardly from the chamber 13 until its shell head engages the abrupt shoulder formed by the pointed member 34 of the member 31 whereupon it will be still more rapidly snapped through the receiver opening 35 by the cooperating action of the extractor hook 23 and the pointed member 33, or the pin 51 of the form shown in Figure 6, which engage the shell portion of the loaded cartridge (see Figure 4), the leaf springs 41, or 53, acting as above described to insure an increase in the rapidity of movement.

It will be understood that the novel features and principles of this invention may be embodied in other specific forms without departing from the spirit and essential attributes thereof, and it is therefore desired that the present embodiments be considered in all respects as illustrative, and not restrictive, reference being had to the claims rather than to the foregoing description to indicate the scope of this invention.

Having thus fully disclosed the invention, what is claimed as new and for which it is desired to secure Letters Patent, is:

1. In a firearm, the combination of a receiver, means to move a cartridge shell lengthwise in said receiver, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector comprising a spring pressed shell engaging first pointed member extending into the receiver and normally lying in the path of the movement of an empty shell to be engaged thereby and to eject it from the receiver and adapted to permit the said shell to pass thereby, and a second shell engaging pointed member extending into the receiver and normally lying in the path of the movement of a loaded shell to be engaged by the loaded shell passed by the first

pointed member and to eject it from the receiver, and common means to connect said pointed members together and to the receiver.

2. In a firearm, the combination of a receiver, means to engage and move a cartridge shell lengthwise in said receiver, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector comprising a spring pressed empty shell engaging first pointed member extending into the receiver and normally lying in the path of movement of the empty shell to be engaged by and to eject the empty shell from the receiver and adapted to permit the shell to pass thereby, a second shell engaging pointed member extending into the receiver and normally lying in the path of movement of a loaded cartridge shell to be engaged by the shell thereof passed by the first pointed member and to eject it from the receiver, said first pointed member being arranged to resiliently engage and to press against a portion of the loaded cartridge shell when the said shell is engaged by the second pointed member.

3. In a firearm, the combination of a receiver, a barrel extending from one end of the receiver, means to extract a cartridge shell from said barrel lengthwise of and into the receiver, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector being formed from one piece of material and having a member adapted to extend into the receiver through an opening therein, said member having pointed portions extending from its inner edge and normally lying in the path of the head of an empty, or loaded, cartridge shell being extracted from the barrel and being spaced apart lengthwise of the receiver, said pointed portions being substantially in lengthwise alignment and lying in a plane substantially parallel to the lengthwise axis of the receiver, the forward one of said pointed portions having a front edge tapering forwardly and away from the inner edge of the member, and a resilient portion to secure the member to the receiver and to press it into the receiver.

4. In a firearm, the combination of a receiver, a barrel extending from the receiver, means to remove a cartridge shell from said barrel, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector comprising one piece of material having a member adapted to extend into the receiver through an opening therein, said member having front and rear pointed portions extending from its inner edge and normally lying in the path of movement of the head of an empty shell, or a loaded shell, being removed from said barrel, and being spaced apart lengthwise of the receiver, the front pointed portion having a front edge tapering forwardly and away from the inner edge of the member to be engaged by the head of an empty shell and to eject the same, and to be engaged by the head of a loaded shell to be pressed outwardly thereby and allow the loaded shell to be moved rearwardly toward and into engagement with the other pointed portion to be ejected thereby from the receiver, and a spring portion having one end secured to the receiver and being tensioned to press the member into the receiver.

5. In a firearm, the combination of a receiver, a barrel extending from the receiver, means to remove a cartridge shell from said barrel, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector being of one piece of material and having a member adapted to extend into the receiver through an opening therein, said member having front and rear pointed portions extending from its inner edge and normally lying in the path of movement of the head of an empty shell, or a loaded shell, being removed from said barrel, and being spaced apart lengthwise of the receiver, the front pointed portion having a front edge tapering forwardly and away from the inner edge of the member, a spring portion bifurcated to provide an end portion separated from a tongue portion, said end portion extending along and secured to the outer surface of the receiver and tensioned to press the member into the receiver, and the tongue portion extending along the inner surface of the receiver and pressed outwardly into engagement therewith by said end portion.

6. In combination, a firearm receiver, a barrel, means to move a cartridge shell lengthwise in said receiver, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector having a member extending into said receiver through an opening therein, said member having front and rear pointed portions spaced apart lengthwise of the receiver, both of said pointed portions normally lying in the path of movement of the head of a cartridge shell as it is removed from the barrel, the pointed ends of said pointed portions being in alignment lengthwise and disposed in a plane substantially parallel to the lengthwise axis of the receiver, and resilient means acting on said member to normally retain it in place and to secure it to said receiver.

7. In combination, a firearm receiver, a barrel, means to move a cartridge shell lengthwise in said receiver, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector having a member extending into the receiver through an opening therein, said member having front and rear pointed portions spaced apart lengthwise of the receiver, both of said pointed portions normally lying in the path of movement of the head of a cartridge shell as it is removed from the barrel, the pointed ends of said pointed portions being in alignment lengthwise and disposed in a plane substantially parallel to the lengthwise axis of the receiver, and resilient means acting on said member to normally retain it in place and to secure it to said receiver, the forward edge of the front pointed portion of said member being tapered forwardly and outwardly in respect to the receiver to be engaged by the head of a cartridge shell and swung outwardly as the cartridge shell is drawn out of the barrel to present the rear pointed portion for engagement by the head of the loaded cartridge shell.

8. In combination, a firearm receiver, a barrel, means to move a cartridge shell lengthwise in said receiver, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector having a member extending into the receiver through an opening therein, said member having front and rear pointed portions spaced apart lengthwise of the receiver, both of said pointed portions normally lying in the path of movement of the head of a cartridge shell as it is removed from the barrel, the pointed ends of said pointed portions being in alignment lengthwise and disposed in a plane substantially parallel to the lengthwise axis of the receiver, and resilient means acting on said member to normally retain it in place and to secure it to said receiver, the forward edge of the front pointed portion of said member being tapered forwardly and outwardly in respect to the receiver to be engaged by the head of a loaded cartridge shell and swung outwardly as the cartridge shell is removed from

the barrel to present the rear pointed portion for engagement by the head of the loaded cartridge to eject it from the receiver.

9. In combination, a firearm receiver, a barrel, means to move a cartridge shell lengthwise in said receiver, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector having a member extending into said receiver through an opening therein, said member having front and rear pointed portions spaced apart lengthwise of the receiver, both of said pointed portions normally lying in the path of movement of the head of a cartridge shell as it is removed from the barrel, the pointed ends of said pointed portions being in alignment lengthwise and disposed in a plane substantially parallel to the lengthwise axis of the receiver, a resilient portion extending rearwardly from said member along the outer surface of said receiver, and a tongue portion extending rearwardly from the rear pointed portion of said member in overlying engagement with the inner surface of said receiver, whereby the receiver will be clamped between the resilient portion and the tongue portion, and the tongue portion and the ejector will be detachably secured to the receiver.

10. In combination, a firearm receiver, a barrel, means to extract a cartridge shell from said barrel, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector comprising a plate portion adapted to extend into the receiver and into the path of the head of a cartridge shell extracted from the barrel, a circular ended tongue extending rearwardly from said plate portion with its circular end in engagement with the inner surface of the receiver, a portion extending from the plate portion rearwardly along the exterior surface of the receiver and spring tensioned to constantly urge the circular end of said tongue against the inner surface of the receiver, and means to releasably secure the rear end of the rearwardly extending portion to the receiver.

11. In combination, a firearm receiver, a barrel, means to extract a cartridge shell from said barrel, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector comprising a plate portion adapted to extend into the receiver and into the path of the head of a cartridge shell extracted from the barrel, a circular ended tongue extending rearwardly from said plate portion with its circular end in engagement with the inner surface of the receiver, a portion extending from the plate portion rearwardly along the exterior surface of the receiver and spring tensioned to constantly urge the circular end of said tongue against the inner surface of the receiver, the rear end of said rearwardly extending portion being bent inwardly to enter a cross-slot in the receiver to releasably secure the ejector to the same.

12. In combination, a firearm receiver, a barrel, means to extract a cartridge shell from said barrel, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector comprising a plate portion adapted to extend into the receiver, front and rear pointed members on the inner edge of said plate portion, spaced apart lengthwise of the firearm and with their points normally lying in the path of movement of a cartridge shell extracted from the barrel the points of said pointed members being substantially in alignment lengthwise of the receiver and normally lying in a plane parallel to the lengthwise axis of the receiver, a portion secured to and extending rearwardly from said plate portion along the exterior surface of said receiver and spring tensioned to constantly urge the plate portion inwardly to maintain the pointed members in their normal position and to resist outward movement of the plate portion when a cartridge shell head engages the front pointed member.

13. In combination, a firearm receiver, a barrel, means to extract a cartridge shell from said barrel, and a combined empty cartridge shell and loaded cartridge shell ejector, said ejector comprising a plate portion adapted to extend into the receiver, front and rear pointed members on the inner edge of said plate portion, spaced apart lengthwise of the firearm and normally lying in the path of movement of a cartridge shell extracted from the barrel, a circular ended tongue extending rearwardly from said plate portion with its circular end in engagement with the inner surface of the receiver, a portion secured to and extending rearwardly from said plate portion along the exterior surface of said receiver and spring tensioned to constantly urge the plate portion inwardly to maintain the pointed members in their normal position and to resist outward movement of the plate portion when a cartridge shell head engages the front pointed member, said rearwardly extending portion also constantly urging the circular end of said tongue against the inner surface of the receiver.

14. An ejector for a firearm comprising a member formed from sheet material, said member having an elongated flange portion and a plate portion, said plate portion extending inwardly from one end of said flange portion and bent at right angles thereto, the outer edge of said plate portion having lengthwise spaced apart pointed portions extending inwardly therefrom, the ends of said pointed portions being in lengthwise alignment and disposed in a plane substantially normally parallel to the flange portion, and a tongue extending from the plate portion toward the other end of said flange portion, spaced from and overlying said flange portion.

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