DUAL PURPOSE EXTRACTOR ASSEMBLY FOR MACHINE GUNS

Filed March 30, 1965

INVENTOR

John M. Wallace

BY

Harry M. Saragossi
Edward J. Kelly
Herbert Axelrod & Abstract A. Hurdell

ATTORNEYS
The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to machine guns and pertains more particularly to the cartridge extractor devices therefor.

One of the troublesome problems encountered in the design of modern machine guns is the construction of the firing station. The reduction in the weight of the components is to be made as compactly arranged as possible. In some machine guns, such as the XM140 30 mm. Automatic Gun, the feed pawls are designed for reversible installation to change the direction of rotation of the extractor. Reversal requires the removal of a sliding pawl stop plate, which is located over the cartridge extractor assembly, giving rise to problems as to the design of the extractor assembly and the means for releasably retaining the pawl stop plate in the installed position.

These problems have been overcome and compactness of design achieved by this invention which provides an extractor assembly that also serves to releasably lock the pawl stop plate in installed position and in which the parts are all interlocked together so as to remain assembled when the pawl stop plate is removed for reversal of the feed pawls.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

FIG. 1 is a fragmentary longitudinal cross-section view showing the extractor assembly of this invention installed in a gun with a cartridge located at the firing station and the barrel in battery position;

FIG. 2 is a view taken along line 2--2 of FIG. 1;

FIG. 3 is a further fragmentary view similar to FIG. 2 but shows the cap of the extractor assembly depressed for release of the pawl stop plate;

FIG. 4 is a view similar to FIG. 3 but shows how the interlocking of the parts of the extractor assembly prevents disassembly thereof when the pawl stop plate is removed; and

FIG. 5 is an exploded view of the extractor assembly.

Shown in the figures is an automatic gun 12 having a receiver 14 with an integral breechblock 16 and a barrel 18 which is reciprocal between a forward loading position and a rearward battery position. Gun 12 is adapted for firing a cartridge 20 having a case 22 with an extractor groove 24, which cartridge is linked to others thereof and is fed sideways to a firing station, noted at x--x, in receiver 14. Feeding is effected by a feeding mechanism having a feed pawl device (not shown) which is reversibly mounted in receiver 14 for changing the direction of feed. The reversal of the feed pawl device (not shown) requires the removal of pawl 26 which is slingly mounted in the top of receiver 14 by T-slot means 28 and which is located in the receiver over the firing station.

Pawl stop plate 26 is releasably locked in assembled position and case 22 is held back when barrel 18 is actuated forwardly, for extraction therefrom, by an extractor assembly 30 which is mounted in a vertical bore through the top of receiver 14. Bore 32 is countereored at 34 from the top of receiver 14, under pawl stop plate 26, to a ledge 36.

Extractor assembly 30 includes an extractor 38 having a bar 40 and a cylindrical shaft 42 which extends integrally from the bar intermediate the ends thereof and is received by bore 32 and countereored 34. Shaft 42 includes a large diameter portion 44 which has a diameter similar to that of bore 32 and a coaxial, reduced diameter portion 46 which extends axially from a shoulder 48 so as to be received by countereored 34. A button 50 is formed on the free end of reduced diameter portion 46. Bar 40 is provided with a vertical rib 52 at each end and such ribs have sliding contact with a front face 54 of breechblock 16 to prevent rotation of extractor 38 around the axis of shaft 42. Formed along the bottom of bar 40 is a lip 56 which is engaged by extractor groove 24 of case 22 during displacement thereof to and from engagement with the extractor. A shoulder 58 on bar 40 extends inwardly similar to the inside radius of extractor groove 24 is formed in lip 56 so that the extractor groove of cartridge 20 is in full engagement with the recess, to increase the area of engagement of case 22 and extractor 38, when the cartridge is engaged in the firing station.

Extractor 38 is resiliently mounted by means of a compressible spring 60 coiled around reduced diameter portion 46 within countereored 34. The bottom end of spring 60 seats on a washer 62 which is slingly mounted on reduced diameter portion 46 and which has an inside diameter similar to that of said reduced diameter portion. The top end of spring 60 contacts a cap 64 replaceably mounted on the free end of shaft 42 as hereinafter described.

Cap 64 is cylindrical in configuration and is provided with an annular flange 66 around the bottom end. The outside diameter of flange 66 is similar to the diameter of countereored 34 so as to be slingly received thereby. A knob 68, which is formed above flange 66, is receivable by a mating hole 70 in pawl stop plate 26 when such plate is in the assembled position to releasably hold the pawl stop plate therein. Formed cap 64 is a cylindrical chamber 72 which extends between a top end 74 thereof and an internal flange 76 which forms a shoulder 78 and a cylindrical aperture 80. Chamber 72 has a diameter similar to that of button 50 and aperture 80 has a diameter similar to that of reduced diameter portion 46. Button 50 and reduced diameter portion 46 are immoveable sideways into chamber 72 and aperture 80, respectively, by means of a T-shaped opening 82. As shown in FIG. 3, end 74 and shoulder 78 are spaced so that cap 64 may be displaced sufficiently on shaft 42, for knob 68 to clear hole 70, when the cap is manually depressed by an instrument such as shown at 84. Cap 64 is assembled on and disassembled from shaft 46 by pressing upwardly on bar 40 until it contacts the top of receiver 14, whereupon button 50 is spaced sufficiently above the top of the receiver so that the cap may be slipped over the button through opening 82. Extractor 38 has a vertical displacement, respective to receiver 14, which is limited by contacts of cap 64 with end 74 and shoulder 78 and such displacement is sufficient for the vertical displacement of the extractor as extractor groove 24 moves in and out of engagement with the chamber 72. The upward displacement of extractor 38 causes shoulder 48 thereby to raise washer 62 which, in turn, compresses spring 60 so that the extractor is resiliently returned to its normal downward position when the upward pressure against the extractor is removed.

OPERATION

Extractor assembly 30 is assembled to receiver 14 by inserting shaft 42 upwardly into bore 32 from the inside of the receiver and then dropping first washer 62 and then...
spring 60 down into counterbore 34 and over reduced diameter position 46. Holding extractor 38 up so that bar 40 contacts the top of receiver 14, cap 64 is then slipped sideways onto shaft 42 with button 50 being received by chamber 72. With pawl stop plate 26 installed, extractor 38 has limited vertical movement between contacts of cap 64 with end 74 and the top of flange 66. Also, when pawl stop plate 26 is installed and locked in position, the force of spring 60 is directed against extractor 38, which is biased thereby to its lowest position, as the upward displacement of cap 64 by the spring is blocked through the contact of shoulder 78 with the bottom of pawl stop plate 26.

As cartridge 29 is moved to the firing station during feeding, extractor groove 24 of the cartridge contacts the adjacent end of lip 56, whereby extractor 38 is raised to the end of the lip rides up on top of the case. When the incoming cartridge 28 approaches the firing station, extractor 38 is biased downwardly by the pressure applied by spring 60 through washer 62 to shoulder 43 as extractor groove 24 comes in registry with recess 55, to assure the engagement of the extractor with case 22. After the firing station cartridge 28 is discharged, case 22 is held back by extractor 38 as barrel 18 is forwardly displaced by an operating mechanism (not shown) so as to be extracted from the barrel. After extraction, fired case 22 is moved sideways from the firing station with extractor 38 being raised against the bias of spring 60 as the case moves out of vertical registry with recess 55.

To remove pawl stop plate 26 for reversing the feed pawl device (not shown), an instrument, such as shown at 84, is pressed against the top of knob 68 through hole 70, depressing cap 64 until the knob is clear of the hole. Thus, pawl stop plate 26 is free to be slid from receiver 14 and the feed pawl device (not shown) is thereby freed for removal and reversal. When pawl stop plate 26 is reinstalled, knob 68 snaps up into hole 70 when in registry therewith. As is shown in FIG. 4, when pawl stop plate 26 is removed, extractor assembly 38 remains in assembled condition as cap 64 is retained in assembled position on shaft 42, through the engagement of counterbore 34 with flange 66 and thereby the cap cannot be slid sideways from shaft 42. Flange 66 is held in counterbore 34, when pawl stop plate 26 is removed, through the weight of extractor 38.

Although a particular embodiment of the invention has been described in detail herein, it is evident that many variations may be devised within the spirit and scope thereof and the following claims are intended to include such variations.

I claim:
1. In a machine gun for firing a cartridge having a case with an extractor groove and including a barrel and a receiver with a firing station and a breechblock, the combination including a member slidingly mounted in the receiver adjacent the firing station, and an extractor assembly including means for releasably locking said member in an installed position and means for engaging the extractor groove of the case when in the firing station for extracting the case from the barrel including an extractor provided with a shaft slidingly mounted in a cooperating bore in the receiver, a bar integral with said shaft and disposed for sliding contact with a front face of the breechblock, a lip engageable with the extractor groove when the case is moved sideways to the firing station and an arcuate recess having the same radius as the lip of extractor groove formed in said lip for engagement with the extractor groove when the case is in the firing station.

2. In a machine gun for firing a cartridge having a case with an extractor groove and including a barrel and a receiver with a firing station and a breechblock, the combination including a member slidingly mounted in the receiver adjacent the firing station, and an extractor assembly including means for releasably locking said member in an installed position and means for engaging the extractor groove of the case when in the firing station for extracting the case from the barrel, said means for engaging the extractor groove including an extractor, and said means for releasably locking said member including a cap mounted for limited displacement on said extractor, a knob on said cap receivable by a mating hole in said member for releasably locking said member in the installed position, and a spring mounted on said extractor so as to press against said cap to releasably hold said knob in said hole.

3. The combination as defined in claim 2 wherein said extractor includes a bar with a lip engageable with the extractor groove when the case is in the firing station, a shaft extending from said bar, and means on said shaft disposed in cooperation with said cap for limiting relative displacement thereof to that sufficient for pressing said knob from the hole and for preventing axial removal of said cap from said shaft.

4. The combination as defined in claim 3 wherein said spring is of coiled compressible type and is coiled around said shaft for contact at one end with said cap, and including a shoulder on said shaft, a washer slidably mounted on said shaft between said spring and said shoulder for transferring the force of said spring to said extractor when said knob is received by said hole in said member to resiliently press the extractor against the engaged extractor groove.

5. The combination as defined in claim 3 wherein said means on said shaft includes a button formed on the end thereof, and wherein said cap is provided with a chamber for receiving said button, an end of said chamber and a flange spaced therefrom in said chamber to limit the displacement of said cap on said shaft and prevent axial removal therefrom, and T-shaped opening permitting entrance of said cap only sideways into said chamber.

References Cited by the Examiner
UNITED STATES PATENTS
782,716 2/1905 Bennett 42—25
2,198,610 4/1940 Garand 42—25

References Cited by the Applicant
UNITED STATES PATENTS

BENJAMIN A. BORCHELT, Primary Examiner.