

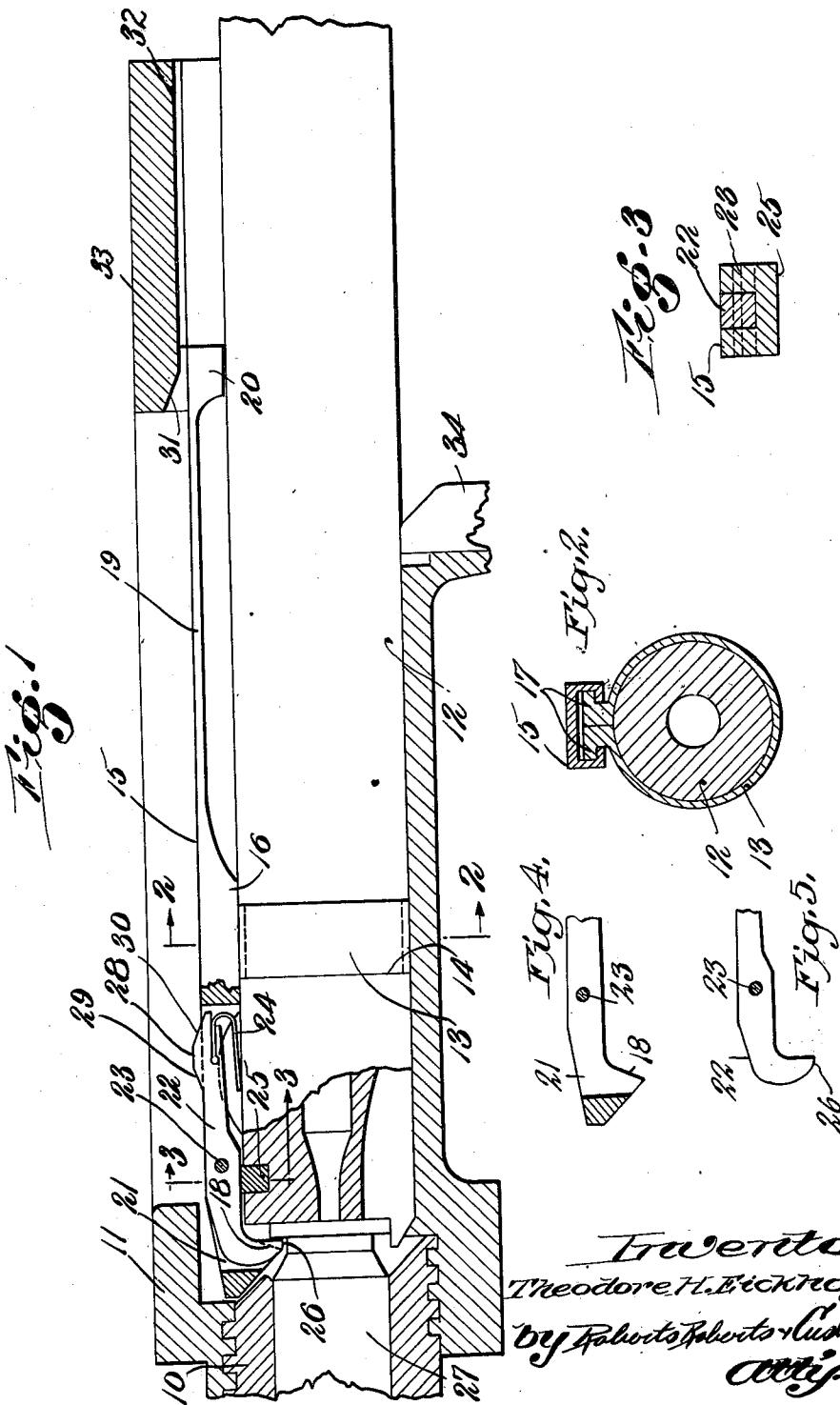
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CARTRIDGE EXTRACTING AND EJECTING MECHANISM FOR FIREARMS

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## CARTRIDGE EXTRACTING AND EJECTING MECHANISM FOR FIREARMS.

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To all whom it may concern:

Be it known that I, THEODORE H. EICKHOFF, a citizen of the United States of America, and resident of Hartford, in the county of Hartford and State of Connecticut, have invented new and useful Improvements in Cartridge Extracting and Ejecting Mechanism for Firearms, of which the following is a specification.

10 This instrument relates to firearms of the kind provided with cartridge extracting and ejecting mechanism, and more particularly to the construction and operation of the parts of a firearm involved in the extraction 15 and ejection of a cartridge.

In the usual form of firearm, in which the extractor and ejector mechanism is controlled by retraction of the bolt in the receiver, as by recoil, the speed of travel of 20 the bolt is so great that the cartridge is thrown a considerable distance from the firearm with an objectionably large force. Furthermore, the strain and wear produced on the mechanism of the firearm is unnecessarily large.

Objects of the present invention are to overcome these difficulties; to provide means whereby a cartridge may be ejected from a firearm with less force and a smaller throw 30 than that produced by a firearm using the ordinary form of extractor and ejector mechanism; to provide a cartridge extractor and ejector mechanism of improved construction and operation in which the extractor member is partially displaced with 35 respect to the bolt during retraction of the bolt within the receiver and then restored to its normal position to facilitate assembly upon further retraction of the bolt, and generally to improve the construction and operation of firearms of the kind referred to.

In one aspect of the invention an extractor for a firearm is so constructed and shaped with relation to the bolt and receiver 45 that rearward movement of the bolt from its most advanced position, while engaging the cartridge, causes a partial release of the cartridge just prior to or at the time of its contact with the ejector, that portion of 50 the extractor retaining engagement with the cartridge being so shaped that further retraction of the bolt causes the cartridge to be thrown only a moderate distance from the firearm as compared with the usual distance to which a cartridge is thrown when

the ordinary form of extractor and ejector are used. Upon further retraction of the bolt the extractor restores to its original relation with respect to the bolt so that assembly or disassembly of the extractor and 60 the bolt may be readily accomplished.

An embodiment of a species of which my invention is a genus, is described hereinafter in connection with the accompanying drawings, in which:

Fig. 1 is a longitudinal section of a portion of a firearm;

Fig. 2 is a section of Fig. 1 on the line 2-2; and

Fig. 3 is a section of the extractor on line 70 3-3 of Fig. 1.

Figs. 4 and 5 are detail views showing the shape of certain parts.

In Fig. 1 the barrel 10 is secured to the receiver 11 within which is mounted the 75 longitudinally slidable bolt 12 having the extractor collar 13 as shown in Fig. 2, or of any usual construction, mounted within the recess 14 in the bolt, the extractor 15 having a lug 16 which is undercut to receive the ears 17 of the extractor collar. The forward end of the extractor is provided with the bevelled hook or nose 18. The spring portion 19 of the extractor member extends rearwardly from the lug 16 and 80 terminates in the back rest 20, the tension of the spring portion being such that the ends of the extractor are normally pressed against the bolt while the portion 16 is forced away from the bolt and pressed 85 against the lower surfaces of ears 17.

A slot or recess 21 centrally disposed between the sides of the extractor extends between the nose 18 and the lug 16. An auxiliary extractor lever 22 is positioned 90 within the slot 21 on pivot 23 supported from extractor 15. Lever 22 is normally pressed in a counter-clockwise direction by the tension of spring 24, one end of which presses against the bolt and the other end 100 of which presses the lever outward from the bolt, the tongue 25 of the extractor 15 providing a stop limiting the counter-clockwise rotation of the lever. The hook 26 at the forward end of lever 22 overhangs 105 the rim of cartridge 27 and withdraws the cartridge from barrel 10 upon retraction of the bolt 12. The protruding stud 28 on lever 22 is provided with bevelled cam surfaces 29 and 30 which engage respectively 110

with cam surfaces 32 and 31 of the bearing 33 forming a part of, or secured to the receiver 11.

Cams 30 and 31 are so disposed that upon 5 retraction of bolt 12 they engage in sliding contact and cause lever 22 to rotate in a clockwise direction to release hook 26 from engagement with cartridge 27 slightly in advance of, or in, or slightly behind the 10 position in which the cartridge engages ejector 34. The bevelled edge of the nose 18 is so directed that upon encountering the cartridge case when the bottom margin of the case encounters the ejector 34, the forward 15 end of the extractor yields upwardly causing a deflection of the spring portion 19 owing to the loose anchorage of the lug 16 to the bolt by way of collar 13. The bevel 18 is so directed and the cams 30 and 20 31 are so positioned with reference to ejector 34 that the cartridge case is ejected with the desired amount of force. By varying the slope of the bevel 18 and the position of the cam 31 longitudinally of the fire arm, 25 the force and velocity with which a cartridge case is ejected may be varied as desired.

When cam 29 registers with cam 32 upon further retraction of bolt 12, spring 24 30 causes the rotation of lever 22 in a counter-clockwise direction to restore the lever to its normal relation with respect to the bolt so that disassembly or assembly is facilitated.

When the bolt is advanced from the last 35 mentioned retracted position, cams 29 and 32 engage and cause lever 22 to rotate in a clockwise direction to a position which is retained as the bolt advances until cams 30 and 31 register to cause lever 22 to return to 40 its normal position in which the hook 26 is adapted to snap over the head of cartridge case 27, after which the above described series of operations may be repeated.

It will be seen that a firearm designed in 45 accordance with the present invention is subjected to less strain and wear in the operation of the extractor and ejector mechanisms than prior fire arms, and the force with which the cartridge case is ejected may 50 be controlled as desired.

I claim:

1. In a firearm, a receiver, a bolt longitudinally slidable therein, means carried by said bolt for engaging and retracting a cartridge case when said bolt is retracted, and co-operating with said receiver for partially releasing the cartridge case in a predetermined retracted position, and an ejector engageable with the cartridge case at a point 55 remote from the locus of partial release for co-operating with said means to eject the cartridge case while said bolt is being retracted.

2. In a firearm, a receiver, a bolt longitudinally slidable therein, means carried by

said bolt for engaging and retracting a cartridge case when said bolt is retracted, said means co-operating with said receiver to yield outwardly from said bolt to partially release the cartridge case in a predetermined 70 retracted position, and an ejector for co-operating with said means to eject the cartridge case while said bolt is being retracted, said ejector engaging the cartridge case at a point remote from said outwardly yielding 75 means.

3. In a firearm, a receiver, a bolt longitudinally slidable therein, means carried by said bolt having a portion yieldable outwardly therefrom arranged to hold the end 80 of a cartridge case in juxtaposition to the end of the bolt when the bolt is retracted from its most advanced position, said means having a cam co-operating with said receiver to cause said holding portion to yield 85 outwardly when the bolt is retracted to a predetermined position and to allow said portion to return inwardly toward said bolt at a predetermined more retracted position.

4. In a firearm, a receiver, a bolt longitudinally slidable therein, means carried by said bolt for engaging and retracting a cartridge case when said bolt is retracted, said means co-operating with said receiver to yield outwardly from said bolt to partially 90 release the cartridge case in a predetermined retracted position, and an ejector co-operating with said means to eject the cartridge case while said bolt is being retracted, said means co-operating with said receiver to return inwardly toward said bolt in a predetermined more retracted position.

5. In a firearm, a receiver, a bolt longitudinally slidable therein, means carried by said bolt for grasping a cartridge case when the bolt is retracted from its most advanced position, said means co-operating with said receiver in a predetermined retracted position of the bolt to change its normal relation with respect to the bolt to release its 105 grasp on the cartridge case and co-operating with the receiver at a more retracted position of the bolt to restore said means to normal relation with respect to the bolt.

6. In a firearm, a receiver, a bolt longitudinally slidable therein, means carried by said bolt having a portion yieldable outwardly therefrom and arranged to hold the end of a cartridge case in juxtaposition to the end of the bolt when the bolt is retracted from its most advanced position, said means having a cam co-operating with the receiver for causing said holding portion to yield outwardly when the bolt has reached a predetermined retracted position and to allow said portion to return inwardly toward said bolt at a predetermined more retracted position, and an ejector for co-operating with said means to eject the cartridge case while said bolt is being retracted.

7. In a firearm, a receiver, a bolt longitudinally slideable therein and having a recess in its periphery, a collar in said recess, means carried on said collar and bolt for engaging and retracting a cartridge case when said bolt is retracted, and co-operating with said receiver for partially releasing the cartridge case in a predetermined retracted position, and an ejector for co-operating with said means to eject the cartridge case while said bolt is being retracted. 70

8. In a firearm, a receiver, a bolt longitudinally slideable therein and having a recess in its periphery, a collar in said recess, an extractor mounted on said collar and bolt and having a tongue engaging said bolt to hold the extractor against longitudinal movement of the bolt, said extractor having means for engaging and retracting a cartridge case when said bolt is retracted, and co-operating with said receiver for partially releasing the cartridge case in a predetermined retracted position, and an ejector for co-operating with said means to eject the cartridge case while said bolt is being retracted. 80

9. In a firearm, a receiver, a bolt longitudinally slideable therein, a main extractor carried by said bolt, an extractor lever pivoted to said main extractor and having a hook at its forward end for grasping a cartridge case, means tending to rotate said lever to force said hook toward the bolt, said extractor having means for limiting the rotation of said lever and means for engaging with said receiver to cause said hook to release its hold on the cartridge case when the bolt is retracted to a predetermined position, said main extractor having a nose for engaging the cartridge case released by said hook, and an ejector co-operating with said nose to eject the cartridge case, said nose being bevelled to reduce the velocity with which the cartridge case is ejected. 90

10. In a firearm, a receiver, a bolt longitudinally slideable therein, a main extractor carried by said bolt and having a central slot therein, an auxiliary extractor disposed within said slot and having a hook for grasping a cartridge case, and means for engaging with said receiver to cause said hook to release its hold on the cartridge case when the bolt is retracted to a predetermined position, said main extractor having a nose for engaging the cartridge case released by said hook, and an ejector co-operating with said nose to eject the cartridge case. 100

11. In a firearm, a barrel for holding a cartridge case, an ejector, means for extracting the cartridge case from said barrel, said means having two parts, one of which grasps the case to withdraw it from the barrel and upon withdrawal of the case from the barrel releases its grasp on the case, and the other of which co-operates with said ejector to eject the cartridge case but engages the cartridge case only after the first part releases its grasp thereon. 110

12. In a firearm, a receiver, a bolt longitudinally slideable therein, a main extractor carried by said bolt and having a central slot therein, an auxiliary extractor having a hook for grasping a cartridge case, and means for engaging with said receiver to cause said hook to release its hold on the cartridge case when the bolt is retracted to a predetermined position, said main extractor having a nose for engaging the cartridge case released by said hook, and an ejector co-operating with said nose to eject the cartridge case when the bolt is retracted to a predetermined position. 120

13. In a firearm, a receiver, a bolt longitudinally slideable therein, a main extractor and an auxiliary extractor carried by said bolt, said auxiliary extractor having a hook for grasping a cartridge case, and means for engaging with said receiver to cause said hook to release its hold on the cartridge case when the bolt is retracted to a predetermined position, said main extractor having a nose for engaging the cartridge case released by said hook, and an ejector co-operating with said nose to eject the cartridge case. 130

having a hook at its forward end for grasping a cartridge case, and having means at its rearward end for engaging with said receiver to tilt the lever with respect to the bolt to cause said hook to release its hold on the cartridge case when the bolt is retracted to a predetermined position, said main extractor having a nose for engaging the cartridge case released by said hook, and an 10 ejector co-operating with said nose to eject the cartridge case when the bolt is retracted to a predetermined position.

17. In a firearm, a receiver, a bolt longitudinally slideable therein, a main extractor 15 carried by said bolt and having a central slot therein, an extractor lever disposed within said slot and pivoted between its ends to said main extractor, said extractor lever having a hook at its forward end for grasping 20 a cartridge case and having means at its rearward end for engaging with said receiver to tilt the lever with respect to the bolt to cause said hook to release its hold on the cartridge case when the bolt is retracted to a predetermined position, said main extractor having a nose for engaging 25 the cartridge case released by said hook, an ejector co-operating with said nose to eject the cartridge case when the bolt is retracted to a predetermined position, the rearward 30 end of said lever engaging with said receiver when the bolt is in a predetermined more retracted position to allow said lever to return to its original position with respect to 35 the bolt.

18. In a firearm, a receiver, a bolt longitudinally slideable therein, means carried by said bolt for engaging and retracting a cartridge case when said bolt is retracted and 40 cooperating with said receiver for partially releasing the cartridge case in a predetermined retracted position, and an ejector movable into the path of said cartridge case at the side of the latter opposite said engaging and retracting means as the cartridge 45 case is retracted and cooperating with said means to effect ejection of said cartridge case.

19. In a firearm, a receiver, a bolt longitudinally slideable therein, means carried by said bolt for engaging and retracting a cartridge case when said bolt is retracted, said means cooperating with said receiver to yield outwardly from said bolt to partially release the cartridge case in a predetermined position, and an ejector movable into the path of said cartridge case as the latter is retracted and engageable with the latter at a point diametrically opposite said 55 means and cooperating with said means to effect ejection of said cartridge case.

20. In a firearm, a receiver, a bolt longitudinally slideable therein, means carried by said bolt for yieldingly engaging and re- 60 tracting a cartridge case when said bolt

is retracted, means positively cooperating therewith when said bolt is partially retracted to effect a partial release of one side of said cartridge case, and an ejector 70 cooperating with the other side of the case to eject the latter while said bolt is being retracted.

21. In a firearm, a receiver, a bolt longitudinally slideable therein, means carried by 75 said bolt for engaging and retracting a cartridge case when said bolt is retracted, means cooperating therewith when said bolt is partially retracted to effect a partial release of said cartridge case, and an ejector movable transversely into the path of said cartridge case as the latter is retracted and co-operating with said means to effect ejection of said cartridge case. 80

22. In a firearm, a receiver, a bolt longitudinally slideable therein, means carried by 85 said bolt for engaging and retracting a cartridge case when said bolt is retracted, and means for effecting a positive but controlled ejection of said cartridge case including an ejector movable into the path of the cartridge case as the latter is retracted and means for effecting a partial release of said case at approximately the instant when said case is engaged by said ejector. 90

23. In a firearm, a receiver, a bolt longitudinally slideable therein, means carried by 95 said bolt for engaging and retracting a cartridge case when said bolt is retracted, and means for effecting a positive but controlled ejection of said cartridge case including 100 means for substantially simultaneously effecting a partial releasing of one side of said cartridge case and applying to the opposite side of the latter an ejecting force. 105

24. In a firearm, a receiver, a bolt longitudinally slideable therein, plural element extractor means carried by said bolt for effecting extraction of said cartridge case when said bolt is retracted, means for causing one of said extractor elements to release 110 said cartridge case as said bolt is retracted, and ejector means cooperating with the remainder of said extractor means to effect ejection of said cartridge case, said releasing extractor element and said ejector means 115 being at opposite sides of the axial line of the cartridge case.

25. In a firearm, a receiver, a bolt longitudinally slideable therein, plural element extractor means carried by said bolt for effecting extraction of said cartridge case when said bolt is retracted, means for causing one of said extractor elements to release 120 said cartridge case as said bolt is retracted, and ejector means movable into the path of said cartridge case substantially at the same moment and cooperating with the remainder of said extractor means to effect ejection of said cartridge case. 125

26. In a firearm, a barrel for holding the 130

cartridge case, an ejector, means for extracting the cartridge case from said barrel, said means having two parts, one of which alone grasps the case to withdraw it from the barrel and upon withdrawal of the case from the barrel releases its grasp on the case and the other of which thereupon and only subsequently to the release of the first part cooperates with said ejector to eject the cartridge case.

27. In a firearm, a barrel for holding the cartridge case, an ejector, means for extracting the cartridge case from said barrel, said

means having two parts closely adjacent to each other and adapted to cooperate with the same side of the cartridge case, one of said parts being adapted to grasp the case to withdraw it from the barrel and upon withdrawal of the case from the barrel to release its grasp on the case and the other of said parts cooperating with said ejector to eject the cartridge case.

Signed by me at Hartford, Conn., this twenty-fourth day of January, 1924.

THEODORE H. EICKHOFF.