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F. P. REED

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EXTRACTOR ASSEMBLY FOR FIREARMS

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Fig. 1

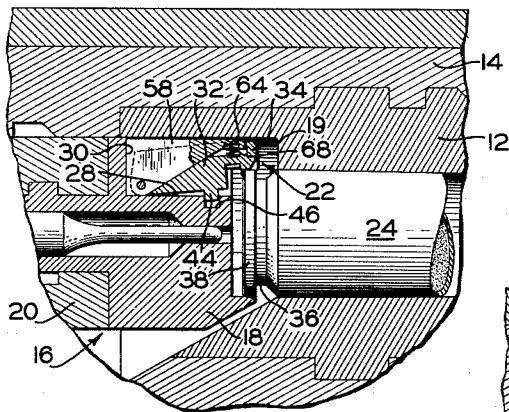


Fig. 2

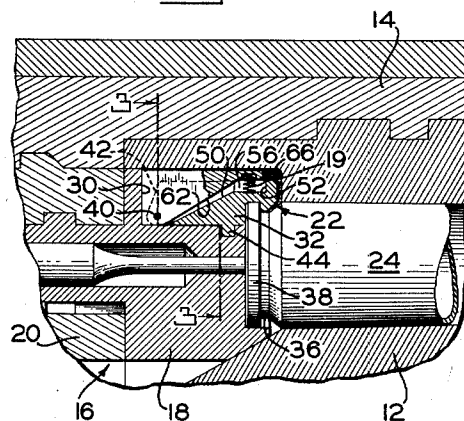


Fig. 3

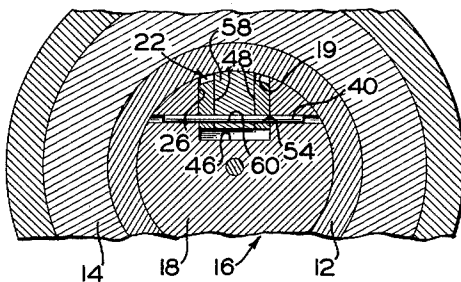
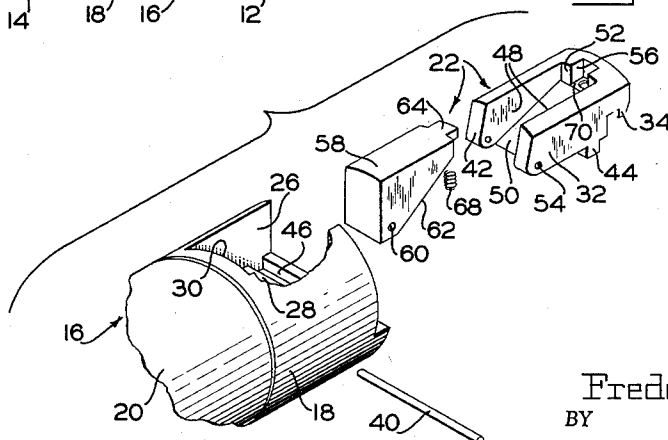


Fig. 4



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EXTRACTOR ASSEMBLY FOR FIREARMS

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4 Claims. (Cl. 42—25)

(Granted under Title 35, U.S. Code (1952), sec. 266)

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

This invention relates to extractors for firearms and more particularly to extractors for firearm bolts having limited axial space for the mounting thereof.

Among the problems which have to be considered in designing extractors for installation in firearm bolts is that which has to do with the mounting of the extractor so that the claw will be positioned as closely as possible to the cartridge rim after riding thereover into the extractor groove. It is important that this clearance be reduced as much as possible so as to reduce the impact between the claw and cartridge rim at the initiation of extraction as such impact causes breakage of the extractor and rupture of the cartridge case.

Another problem relates to the mounting of the extractor so that when rearward force is applied to the cartridge by the extractor a portion of the longitudinal force will be converted to a downward component of force for retaining the extractor to the cartridge, but such downward component of force must not be so great that the claw will dig into the rim.

These problems are met by placing the fulcrum of the extractor on a longitudinal line passing slightly below the tip of the claw, when the extractor is in the cartridge retaining position, so that when force is applied to the cartridge by the extractor the latter will seek a dead center relationship therewith and thereby create a downward component of force to press the claw into the extractor groove. Also, by locating the center line of the fulcrum as close as possible to the center line of the claw tip the claw will be at a minimum distance from the rim after passing thereover into the extractor groove. The distance between the claw and rim is also reduced by moving the fulcrum as far rearwardly as possible from the claw to increase the radius in which it swings.

These problems have been satisfactorily solved in the past where axial space for mounting the extractor is not limited. But heretofore there has not been any satisfactory solution where the extractor has to be mounted in a very limited axial space as in the bolt head of a bolt assembly such as is disclosed in patent application No. 719,172 now, Patent No. 2,950,653, for a "Bolt Assembly for a Firearm" filed by Earle M. Harvey.

Such limited space also creates a critical problem in regards to the mounting of the spring which biases the extractor into engagement with the cartridge case. Through the limitations as to space it is important that the spring be disposed, so that the full load thereof is applied to the claw without a mechanical loss of load, whereby the size of the spring may be kept to a minimum.

It is therefore an object of this invention to provide an extractor device for installation in bolts wherein axial space for mounting the extractor is limited.

It is another object of this invention to provide such an extractor device in which the extractor spring is dis-

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posed directly above the extractor claw so that the full load of the spring is applied thereto, whereby the size of the spring may be kept to a minimum.

It is another object of this invention to provide such an extractor device wherein the fulcrum of the extractor is disposed close to the rear end of the bolt head and slightly below the level of the tip of the extractor claw to keep to a minimum the space between the claw and cartridge rim after the claw rides thereover into the extractor groove and to assume engagement of the extractor to the cartridge.

It is a further object of this invention to provide such an extractor device which is simple and rugged in construction, positive in operation and easy to manufacture.

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 longitudinally cross-sectioned side view of the extractor device mounted to a bolt head with the claw shown at the limit of the climb thereof when riding over the rim of the chambered cartridge to enter the extractor groove thereof;

Fig. 2 is a view similar to Fig. 1 but showing the claw received by the extractor groove;

Fig. 3 is a view taken along line 3—3 of Fig. 2; and

Fig. 4 is a perspective, exploded view of the bolt head and extractor device.

Shown in the figures is a firearm having a barrel 12 with a barrel extension 14 mounted to the breech end thereof and a reciprocal bolt assembly 16. Bolt assembly 16 includes a nonrotating cylindrical head 18, which is insertable through a mating aperture 19 in barrel extension 14 for battery position contact with the breech end of barrel 12, and a locking sleeve 20 mounted adjacent the rear end of head 18 for rotation to and from a lock position. Head 18 carries an extractor device 22 for removing a cartridge case 24 from barrel 12 when bolt assembly 16 is actuated rearwardly in a recoil stroke.

Extractor device 22 is disposed in a pocket 26 which is formed in the upper portion of head 18 and is of rectangular cross-section. Pocket 26 is open for communication from the outside of head 18 at both the front and top of the pocket and the walls of the pocket include a bottom 28 which is disposed at right angles to the vertical plane of head 18 and parallel to the longitudinal axis thereof and a rear wall 30 which extends upwardly at right angles from the rear end of such bottom. Rear wall 30 is located as close to the rear end of head 18 as is possible without impairing the structural strength thereof.

Extractor device 22 includes an extractor 32 which is substantially rectangular in configuration with vertically disposed sides having sliding contact with the corresponding sides of pocket 26. A claw 34 extends integrally forward from the top side of extractor 32 to be receivable by an extractor groove 36 in a barrel chambered cartridge case 24. Extractor 32 is pivotally mounted on head 18 so that claw 34 may ride over a rim 38 on cartridge case 24 to enter extractor groove 36 when bolt assembly 16 goes into battery position. Such pivotal mounting is effected by a pin 40 which traverses head 18 below the level of the tip of claw 34, when the claw is received by extractor groove 36, and traverses extractor 32 through the lower rear corner thereof to act as a fulcrum for the pivotal displacement thereof. Extractor 32 has a rear end 42 which inclines upwardly and forwardly from the bottom of the extractor to provide sufficient clearance between such rear end and rear wall 30 for the extractor to pivot so that claw 34 can ride over rim 38.

Depending from the underside of extractor 32 is a flange 44 which extends thereacross at right angles to the

longitudinal axis of the extractor and such flange is received by a mating slot 46 in bottom 28 to take the load between bolt assembly 16 and extractor 32 when the strain on pin 40 becomes excessive. A recess 48 of rectangular cross section extends forwardly from rear side 42 central of the sides of extractor 32. Recess 48 forms a floor 50 which extends upwardly and forwardly from the bottom of extractor 32, immediately forward of where pin 40 passes therethrough, to a vertical forward wall 52 which is disposed in the upper portion of the extractor where claw 34 extends therefrom so as to be positioned substantially in alignment with the front face of head 18. Recess 48 divides the rear end of extractor 32 and provided in each of the divided portions is a hole 54 which receives pin 40 for pivotally mounting the extractor. A rectangular channel 56 extends forwardly from forward wall 52 central thereof and above claw 34. Channel 56 opens to both recess 48 and the top of extractor 32.

Recess 48 receives a retainer 58 which has substantially the same configuration as the recess, except as hereinafter noted. Retainer 58 is secured in contact with rear wall 30, so as to project immovably forward therefrom, by pin 40 which is received by a bore 60 through such retainer. Thus, extractor 32 and retainer 58 are both assembled to head 18 by pin 40.

Retainer 58 includes an underside 62 which coincides with floor 50 except that such underside inclines at a slightly more acute angle to provide clearance for the pivotal displacement of extractor 32. Underside 62 is also disposed so that the climb of extractor 32, when claw 34 rides over rim 38, is limited by the contact of floor 50 with such underside.

Extending forwardly from the front end of retainer 58 is a rectangular lug 64 which is received by channel 56. A well 66 extends upwardly into lug 64 from the bottom side thereof and such well receives a compressible coil spring 68 which bottoms on a floor 70 of channel 56 to bias extractor 32 downwardly to a position wherein claw 34 is fully received by extractor groove 36.

From the foregoing it is readily apparent that the criteria for good extractor design and installation have been met herein, although extractor device 22 is installed in head 18 where axial space is limited. This has been achieved by locating pin 40, which is the fulcrum around which extractor 32 pivots, as far as possible from claw 34 and slightly below the tip of the claw so that a portion of the longitudinal component of force applied between bolt assembly 16 and extractor 32 when cartridge case 24 is extracted from barrel 12 is converted to a downward component of force to retain the claw in extractor groove 36. Moreover, spring 68 is disposed directly over claw 34 so that the full load of the spring is applied thereto and the size of the spring may therefore be kept at a minimum.

Extractor device 22 is also seen to be easily assembled to and disassembled from head 18 merely by the insertion or removal of pin 40. It is also rugged in construction, positive in operation and easy to manufacture.

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. An extractor device for a firearm having a barrel with a barrel extension mounted on the breech end thereof and a reciprocal bolt assembly including a cylindrical head receivable by a mating hole in the barrel extension for battery position contact with the breech end of the barrel and a rotatable locking sleeve disposed in contact with the rear end of the barrel, the extractor device including an extractor disposed within the head, a claw extending integrally forward from said extractor, means for mounting said extractor on the head for pivotal displacement around a fulcrum disposed adjacent the rear end of the head and between said claw and the axis of the head, and a retainer engaged to the head for projection into a recess in said extractor to contactably stop displacement of said extractor away from the axis of the head at a climb position and mount a spring radially respective to the head for engagement with said extractor adjacent said claw to bias said extractor towards the axis of the head to a cartridge retaining position.

2. An extractor device for a firearm having a barrel with a barrel extension mounted on the breech end thereof and a reciprocal bolt assembly including a cylindrical head receivable by a mating hole in the barrel extension for battery position contact with the breech end of the barrel and a rotatable locking sleeve disposed in contact with the rear end of the head, the extractor device including an extractor received by a pocket in the head, said head being provided with a pocket having a bottom disposed between the axis of the head and the outside periphery thereof and a rear wall disposed adjacent the rear end of the head, a cartridge engaging claw extending integrally forward from the top of said extractor, a retainer extending forwardly from the rear wall of the pocket into a recess provided therefor in said extractor, a pin extending transversely through the head so as to extend through said retainer to maintain engagement thereof with the rear wall and through said extractor adjacent the rear end thereof and between said claw and the axis of the head to provide a fulcrum for the pivotal displacement of said extractor, and a spring disposed between said retainer and extractor for biasing thereof towards the axis of the head to a cartridge retaining position.

3. The extractor device as defined in claim 2 wherein said recess in said extractor for receiving said retainer includes a floor and said retainer includes an underside disposed for contact by said floor to limit the pivotal displacement of said extractor away from the axis of the head at a climb position.

4. The extractor device as defined in claim 2 wherein a channel with a bottom surface extends forwardly in said extractor from said recess so as to be disposed farther from the axis of the head than said claw and said retainer includes a lug which projects forwardly therefrom into said channel and said spring is disposed between said lug and said bottom surface.

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