May 27, 1947. J. H. DELSOLE 2,421,249

EXTRACTOR-AND-BREECH-BOLT ASSEMBLY FOR FIREARMS

Filed April 19, 1945

Fig. 1.

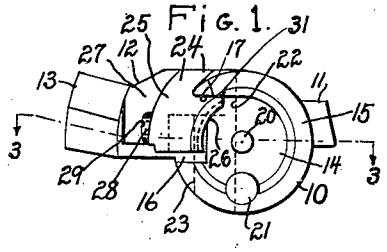


Fig. 4.

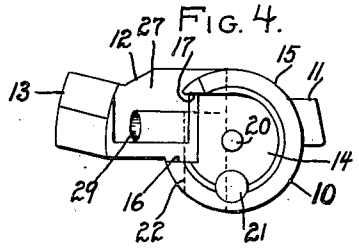


Fig. 3.

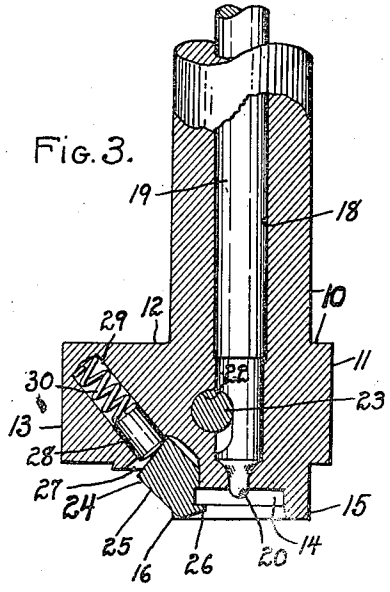


Fig. 2.

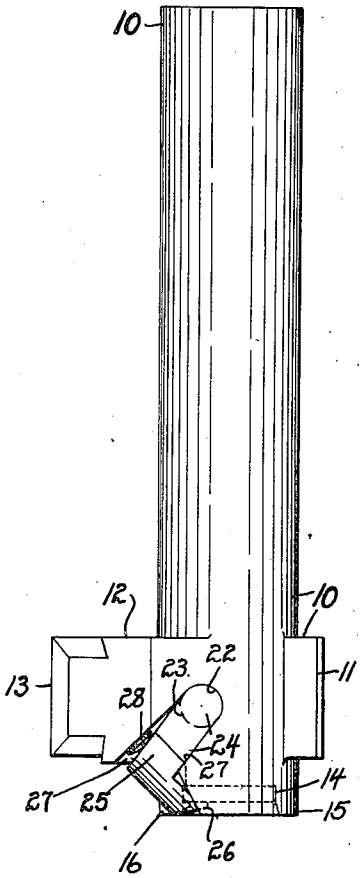
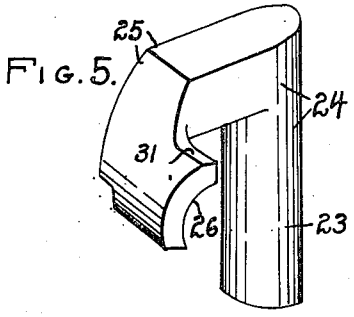


Fig. 5.



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EXTRACTOR-AND-BREECH-BOLT ASSEMBLY FOR FIREARMS

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7 Claims. (Cl. 42—25)

1

The present invention relates to improvements in firearms and relates more particularly to improvements in extractor-and-breech-bolt assemblies which include a movable breech-bolt and a cartridge-extractor carried by and movable relative to the said breech-bolt.

It may here be noted that cartridge-extractors, when carried by a movable breech-bolt, are subjected to violent displacing stresses incident to the movement of the breech-bolt. These displacing stresses are particularly heavy in self-loading military firearms of the well-known Garand type and the well known carbine M1, wherein the breech-bolt not only reciprocates lengthwise of itself but also turns transversely, which turning movement produces high centrifugal forces tending to displace the cartridge-extractor from the breech-bolt.

One of the objects of the present invention is to provide a superior extractor-and-breech-bolt assembly so constructed and arranged as to insure that the cartridge-extractor will be firmly held in assembled relationship with respect to its complemental breech-bolt, despite high displacing stresses.

Another object of the present invention is to provide a superior assembly of the character referred to in which the cartridge-extractor is firmly held in assembled relationship with respect to the movable breech-bolt and in which the said cartridge-extractor may be readily detached or separated from the breech-bolt when desired.

A further object of the present invention is to provide a superior assembly of the character referred to comprising a breech-bolt adapted to both reciprocate longitudinally and turn transversely, together with a cartridge-extractor pivotally carried by the said breech-bolt, and in which assembly the said cartridge-extractor is held against accidental displacement from the breech-bolt in a simple, reliable and effective manner.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

Fig. 1 is a view in front-end elevation of an extractor-and-breech-bolt assembly constructed in accordance with the present invention;

Fig. 2 is a top or plan view thereof;

2

Fig. 3 is a broken view in central-longitudinal section taken on the line 3—3 of Fig. 1;

Fig. 4 is a view in front-end elevation of the breech-bolt with the cartridge-extractor, extractor-plunger, and extractor-spring omitted; and

Fig. 5 is a perspective view of the cartridge-extractor, detached.

For the purpose of illustrating one embodiment of the present invention, there is shown in the accompanying drawings a breech-bolt which is generally designated by the reference character 10 and which is, generally speaking, of cylindrical form. Adjacent its forward end, the said breech-bolt is formed with two laterally-projecting locking-lugs 11 and 12 respectively located at substantially diametrically-opposite points and preferably formed integral with the breech-bolt 10 proper. Projecting outwardly in turn from the outer end of the locking-lug 12 is an integral operating-lug 13 which may be utilized for connection to an action-slide of a firearm of the type of the well known carbine M1.

In its forward face, the breech-bolt 10 is formed with a forwardly-opening cartridge-receiving recess 14 which is adapted to successively receive respectively the head-ends of cartridge-casings in a manner well known in the art. The production of the cartridge-receiving recess 14 results in the formation on the front-end of the breech-bolt of a cartridge-retaining flange 15 extending forwardly and substantially annular in form save where it is cut away at one side to provide an extractor-accommodating notch 16. The upper wall of the said notch 16 provides a downwardly-facing extractor-retaining abutment 17, for purposes as will hereinafter appear.

Extending axially through the breech-bolt 10 is a passage 18 in which is adapted to reciprocate a suitable firing-pin 19 having a firing-point 20 at its forward end which is adapted to engage with the primer of a cartridge seated in the cartridge-receiving recess 14 in the front of the breech-bolt, all in a manner well known in the art. Eccentrically of and parallel with the firing-pin 19, is a reciprocating ejector 21 not per se forming a part of the present invention and requiring no detailed description herein.

Extending perpendicularly with respect to the axial passage 18 and the breech-bolt 10 and laterally-intersecting the same, is a cylindrically-contoured vertical passage 22 which is adapted to receive the vertical cylindrically-contoured stem 23 of a cartridge-extractor generally designated by the reference character 24. In addition to its stem 23, the said cartridge-extractor in-

cludes a body-portion 25 having at its forward end a hook-like cartridge-extracting lip 26 adapted to fit into a cannelure forming a feature of a cartridge-casing, as is common in the art.

The body-portion 25 of the cartridge-extractor 24 is accommodated in an upwardly-opening recess 27 formed in the upper portion of the breech-bolt 10 and extending part way into the locking-lug 12 thereof. The passage 22 which accommodates the stem 23 of the cartridge-extractor 24, leads downwardly from the bottom of the inner portion of the said recess 27 and through the under face of the breech-bolt 10, as is indicated by broken lines in Fig. 4.

For the purpose of yieldingly urging the cartridge-extractor 24 to turn about its stem 23 as a center and in the direction required to move its cartridge-extracting lip 26 inwardly for engagement with a cartridge-casing, an extractor-plunger 28 is provided. The said extractor-plunger is disposed for reciprocation obliquely with respect to the longitudinal axis of the breech-bolt, as is shown in Fig. 3, and has its outer end engaged with the outer face of the body-portion 25 of the cartridge-extractor 24. The said extractor-plunger 28 is mounted for reciprocation in the forward end of a pocket 29 formed in the outwardly-and-forwardly-sloping rear wall of the recess 27 in which the body-portion 25 is accommodated. Interposed between the inner end of the extractor-plunger 28 and the bottom of the pocket 29, is a helical extractor-spring 30 which urges the said extractor-plunger into engagement with the body-portion 25 of the cartridge-extractor 24.

It will be noted by reference to Figs. 1 and 5 in particular that adjacent its cartridge-extracting lip 26 the body-portion 25 of the cartridge-extractor 24 is formed with an upwardly-facing retaining-abutment 31 which is adapted to engage with the downwardly-facing extractor-retaining abutment 17 in the upper portion of the cartridge-retaining flange 15, when the forward end of the extractor is swung inwardly into position for engagement with the head-end of a cartridge. By swinging the front end of the cartridge-extractor 24 outwardly to the limit of the movement permitted by the recess 27, the retaining-abutment 31 of the said extractor may be swung clear of the extractor-retaining abutment 17 of the breech-bolt, to thus permit the removal of the cartridge-extractor. The described swinging movement of the cartridge-extractor into a clearance position may be manually accomplished against the tension provided by the extractor-spring 30.

When the cartridge-extracting lip 26 of the cartridge-extractor 24 is swung inwardly by the extractor-spring 30, as is shown in the drawings, the said lip is in position to enter the cannelure of a cartridge to effect the extraction thereof when the breech-bolt 10 is retired rearwardly lengthwise of itself. In the position of the lip 26 just referred to, the retaining-abutment 31 of the cartridge-extractor is located beneath the extractor-retaining abutment 17 on the under surface of the upper portion of the cartridge-retaining flange 15. The conditions last described also prevail even though the cartridge-extracting lip 26 is swung outwardly, as would be the case when it is forcing its way over the head of a cartridge in order to enter the cannelure thereof.

Thus, under all operating conditions, the extractor-retaining abutment 17 of the breech-bolt 10 overlies the retaining-abutment 31 of the cartridge-extractor 24, so that centrifugal or other forces tending to lift the said cartridge-extractor out of the recess 27 and the passage 22 in the breech-bolt, will be positively resisted. However, and as before pointed out, should it be desired to remove the cartridge-extractor 24 from the breech-bolt 10, the said cartridge-extractor may be swung against the tension of the extractor-spring 30 to the limit of the movement permitted by the sloping rear wall of the recess 27, whereupon the upwardly-facing retaining-abutment 31 of the cartridge-extractor will be shifted completely out from under the extractor-retaining abutment 17 of the breech-bolt. Under the conditions last described, the cartridge-extractor 24 will be free to be lifted upwardly, out of the recess 27 and the vertical passage 22 in the breech-bolt 10.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

I claim:

1. An extractor-and-breach-bolt assembly for firearms, including in combination: a breech-bolt having a cartridge-receiving recess in its forward face and having a flange-portion at the outer boundary of the said recess, the said flange-portion being cut away to form an inwardly-facing extractor-retaining abutment extending substantially parallel with the plane of movement of the hereinafter-mentioned cartridge-extractor, the said breech-bolt being also provided with an extractor-accommodating recess extending substantially perpendicularly with respect to the longitudinal axis of the breech-bolt and located adjacent the said extractor-retaining abutment; a cartridge-extractor movably mounted in the extractor-accommodating recess in the said breech-bolt and having a cartridge-extracting lip movable into and away from the cartridge-receiving recess in the front of the said breech-bolt to engage with a cartridge seated therein, the said cartridge-extractor also having an outwardly facing retaining-abutment constructed and arranged to engage with the extractor-retaining abutment of the said breech-bolt to retain the cartridge-extractor in the extractor-accommodating recess in the breech-bolt against ejection therefrom by centrifugal force when the cartridge-extracting lip of the said cartridge-extractor is in engagement with a cartridge, and the said retaining-abutment being retirable out of cooperating relationship with respect to the said extractor-retaining abutment; and spring-means yieldingly urging the said cartridge-extractor into position to cause its cartridge-extracting lip to engage with a cartridge and to cause its retaining-abutment to move into position to engage with the extractor-retaining abutment of the said breech-bolt.

2. An extractor-and-breech-bolt assembly for firearms, including in combination: a breech-bolt having a cartridge-receiving recess in its forward face and having a substantially-annular forwardly-projecting flange forming a lateral boundary for the said recess, the said flange being formed with a notch having one end shaped to form an inwardly-facing extractor-retaining abutment extending substantially parallel with

the plane of movement of the hereinafter-mentioned cartridge-extractor, the said breech-bolt also being provided with an extractor-accommodating recess extending substantially perpendicularly with respect to the longitudinal axis of the breech-bolt and located adjacent the notch in the said flange; a cartridge-extractor movably mounted in the extractor-accommodating recess in the said breech-bolt and having a cartridge-extracting lip movable in the notch in the flange of the said breech-bolt, the said cartridge-extractor also having an outwardly-facing retaining-abutment constructed and arranged to engage with the extractor-retaining abutment of the flange of the said breech-bolt to retain the said cartridge-extractor in the extractor-accommodating recess in the breech-bolt against ejection therefrom by centrifugal force when the cartridge-extracting lip of the said cartridge-extractor extends inwardly through the said notch into engagement with a cartridge, and the said retaining-abutment being retirable out of cooperating relationship with respect to the said extractor-retaining abutment; and spring-means yieldingly urging the said cartridge-extractor into position to cause its cartridge-extracting lip to engage with a cartridge and to cause its retaining-abutment to move into position to engage with the extractor-retaining abutment of the said breech-bolt.

3. An extractor-and-breech-bolt assembly for firearms, including in combination: a breech-bolt having a cartridge-receiving recess in its forward face and having a flange-portion at the outer boundary of the said recess, the said flange-portion being cut away to form an inwardly-facing extractor-retaining abutment extending substantially parallel with the plane of movement of the hereinafter-mentioned cartridge-extractor, the said breech-bolt being also provided with an extractor-accommodating recess extending substantially perpendicularly with respect to the longitudinal axis of the breech-bolt and located adjacent the said extractor-retaining abutment; a a cartridge-extractor pivotally mounted in the extractor-accommodating recess in the said breech-bolt and having a cartridge-extracting lip swingable into and away from the cartridge-receiving recess in the front of the said breech-bolt to engage with a cartridge seated therein, the said cartridge-extractor also having an outwardly-facing retaining-abutment constructed and arranged to engage with the extractor-retaining abutment of the said breech-bolt to retain the cartridge-extractor in the cartridge-extractor-accommodating recess in the breech-bolt against ejection therefrom by centrifugal force when the cartridge-extracting lip of the said cartridge-extractor is in engagement with a cartridge, and the said retaining-abutment being swingable out of cooperating relationship with respect to the said extractor-retaining abutment; and spring-means yieldingly urging the said cartridge-extractor to swing into position to cause its cartridge-extracting lip to engage with a cartridge and to cause its retaining-abutment to swing into position for engagement with the extractor-retaining abutment of the said breech-bolt.

4. An extractor-and-breech-bolt assembly for firearms, including in combination: a breech-bolt having a cartridge-receiving recess in its forward face and having a substantially-annular forwardly-projecting flange forming a lateral boundary for the said recess, the said flange being

formed with a notch having one end shaped to form an inwardly-facing extractor-retaining abutment extending substantially parallel with the plane of movement of the hereinafter-mentioned cartridge-extractor, the said breech-bolt also being provided with an extractor-accommodating recess extending substantially perpendicularly with respect to the longitudinal axis of the breech-bolt and located adjacent the notch in the said flange; a cartridge-extractor pivotally mounted in the extractor-accommodating recess in the said breech-bolt and having a cartridge-extracting lip swingable into and away from the cartridge-receiving recess in the front of the said breech-bolt to engage with a cartridge seated therein, the said cartridge-extractor also having an outwardly-facing retaining-abutment constructed and arranged to engage with the extractor-retaining abutment in the wall of the notch of the said breech-bolt to retain the cartridge-extractor in the extractor-accommodating recess in the breech-bolt against ejection therefrom by centrifugal force when the cartridge-extracting lip of the cartridge-extractor is in engagement with a cartridge, and the said retaining-abutment being swingable out of cooperating relationship with respect to the said extractor-retaining abutment; and spring-means yieldingly urging the said cartridge-extractor to swing into position to cause its cartridge-extracting lip to engage with a cartridge and to cause its retaining-abutment to swing into position for engagement with the extractor-retaining abutment of the said breech-bolt.

5. An extractor-and-breech-bolt assembly for firearms, including in combination: a breech-bolt having a cartridge-receiving recess in its forward face and having a flange-portion at the outer boundary of the said recess, the said flange-portion being cut away to form an inwardly-facing extractor-retaining abutment extending in a direction substantially crosswise of the stem of the hereinafter-mentioned cartridge-extractor, the said breech-bolt being also provided with an extractor-accommodating recess extending substantially perpendicularly with respect to the longitudinal axis of the breech-bolt and located adjacent the said extractor-retaining abutment, the said extractor-retaining recess also including a stem-receiving passage also extending substantially perpendicularly with respect to the longitudinal axis of the breech-bolt; a cartridge-extractor comprising a body-portion, a cylindrically-contoured stem at one end and a cartridge-extracting lip at its other end, the said stem being pivotally mounted in the stem-receiving passage in the breech-bolt and the said body-portion being movable in the said extractor-accommodating recess and the said cartridge-extracting lip being swingable into and away from the cartridge-receiving recess in the front of the breech-bolt to engage with a cartridge seated therein, the said cartridge-extractor also having an outwardly-facing retaining-abutment constructed and arranged to engage with the extractor-retaining abutment of the said breech-bolt to retain the stem and the body-portion of the said cartridge-extractor respectively in the stem-receiving passage and the extractor-accommodating recess in the said breech-bolt against ejection therefrom by centrifugal force when the cartridge-extracting lip of the said cartridge-extractor is in engagement with a cartridge, and the said retaining-abutment being swingable out of cooperating relationship with respect to the

said extractor-retaining abutment; and spring-means yieldingly urging the said cartridge-extractor to swing about its said stem into position to cause its cartridge-extracting lip to engage with a cartridge and to cause its retaining-abutment to swing into position for engagement with the extractor-retaining abutment of the said breech-bolt.

6. An extractor-and-breech-bolt assembly for firearms, including in combination: a breech-bolt having cartridge-engaging means in its forward face and having an inwardly-facing extractor-retaining abutment extending substantially parallel with the plane of movement of the hereinafter-mentioned cartridge-extractor, the said breech-bolt also being provided with an extractor-accommodating recess extending substantially perpendicularly with respect to the longitudinal axis of the breech-bolt and located adjacent the said cartridge-retaining abutment; a cartridge-extractor movably mounted in the extractor-accommodating recess in the said breech-bolt and having a cartridge-extracting lip movable into and away from a cartridge seated against the cartridge-engaging means at the forward end of the said breech-bolt, the said cartridge-extractor also having an outwardly-facing retaining-abutment constructed and arranged to engage with the extractor-retaining abutment of the said breech-bolt to retain the cartridge-extractor in the extractor-accommodating recess in the breech-bolt against ejection therefore by centrifugal force when the cartridge-extracting lip of the said cartridge-extractor is in engagement with a cartridge, and the said retaining-abutment being retirable out of cooperating relationship with respect to the said extractor-retaining abutment; and spring-means yieldingly urging the said cartridge-extractor into position to cause its cartridge-extracting lip to engage with a cartridge and to cause its retaining-abutment to move into position to engage with the extractor-retaining abutment of the said breech-bolt.

7. An extractor-and-breech-bolt assembly for

firearms, including in combination: a breech-bolt having cartridge-engaging means in its forward face and having an inwardly-facing extractor-retaining abutment extending substantially parallel with the plane of movement of the hereinafter-mentioned cartridge-extractor, the said breech-bolt also being provided with an extractor-accommodating recess extending substantially perpendicularly with respect to the longitudinal axis of the breech-bolt and located adjacent the said cartridge-retaining abutment; a cartridge-extractor pivotally mounted in the extractor-accommodating recess in the said breech-bolt and having a cartridge-extracting lip swingable into and away from a cartridge seated against the cartridge-engaging means at the forward end of the said breech-bolt, the said cartridge-extractor also having an outwardly-facing retaining-abutment constructed and arranged to engage with the extractor-retaining abutment of the said breech-bolt to retain the cartridge-extractor in the extractor-accommodating recess in the breech-bolt against ejection therefrom by centrifugal force when the cartridge-extracting lip of the said cartridge-extractor is in engagement with a cartridge, and the said retaining-abutment being retirable out of cooperating relationship with respect to the said extractor-retaining abutment; and spring-means yieldingly urging the said cartridge-extractor to swing into position to cause its cartridge-extracting lip to engage with a cartridge and to cause its retaining-abutment to swing into position to engage with the extractor-retaining abutment of the said breech-bolt.

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