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Ejection device for fire arm.

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The invention concerns an ejection device for a fire arm with an automatic or manual cycle, whereby this fire arm contains a casing, a gun mounted on this casing and which is equipped with a fire chamber and movable elements which can be moved backward in relation to the casing during the recoil, whereby the movable elements contain an extractor to carry along a case during the recoil and an element to close the chamber, whereby the ejection device contains an ejector mounted in this closing element.

15

Generally, in order to ensure the automatic or manual "extraction/ejection of the case/feeding of the next ammunition" cycle of fire arms and in particular of infantry arms, the above-mentioned movable elements such as the bolt, slide and breech bolt move, ensuring among others that the chamber of the fire arm is closed.

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During the recoil of the movable elements, the non-initialised cartridge or case is extracted from the chamber by means of the extractor which catches the case by its neck.

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After a sufficient course, a tilting torque of the case is created by the ejector, which is fixed in the casing or mounted on the spring in the bolt which is generally positioned diametrically opposed to the extractor, which ensures an ejection trajectory of the case situated approximately in a perpendicular plane to the axis of the

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gun.

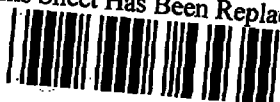
In order to avoid hurting a right-handed shooter, this trajectory, whose angle is determined by the relative
5 positions of the ejector/extractor, is generally situated in a more or less perpendicular direction to the axis of the gun and to the right of the fire arm.

By means of special modifications, which are
10 indispensable in so-called "bull pup" guns whose course of the movable elements is situated in the grip and whereby this trajectory would interfere with the head of the shooter, the ejection trajectory can be situated
15 between the vertical line and the left so as to make the fire arm more suitable for left-handed shooters.

This system is disadvantageous in that a far-reaching dismounting of the arm is required, which is not very
20 accessible to the user, so that the fire arms are dedicated to left-handed and right-handed shooters, with the risk of harm in case of a mistake.

The invention aims to remedy this disadvantage and to provide an ejection trajectory which is suitable for both
25 left-handed and right-handed shooters with one and the same fire arm without any modifications being required, and thus aims a truly ambidextrous fire arm.

To this aim, the ejection device contains an ejection
30 lever mounted in a pivoting manner around a transversal axis and containing a guiding element provided with a passage for a case, whereby said ejection lever tilts between a lower position in which the entry of its passage is situated in the trajectory of the case as the



movable elements return forward and a higher position, whereby a button is provided to eject the case out of the passage as the ejection lever gains its higher position.

- 5 Preferably, the button is made in one piece with a movable element.

The ejection device may contain a spring pushing the ejection lever towards its lower position.

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The tilting towards its lower position is caused by the movable parts as they return forward, either with the help of the case or by making direct contact.

- 15 In order to better explain the characteristics of the invention, the following embodiment of the invention is given as an example only without being limitative in any way, with reference to the accompanying drawings, in which:

20

figure 1 shows a schematic side view of a part of a fire arm equipped with an ejection device according to the invention;

25

figures 1 to 8 show a section of the part of the fire arm represented in figure 1, but in different positions during the ejection of a cartridge;

30

figure 9 represents a section according to line IX-IX of figure 7;

figure 10 shows a section to a larger scale of the part of the arm indicated by F10 in figure 4.



Figures 1 to 8 show a part of a gas-operated gun with a rotating bolt containing a casing 1, a gun 2 mounted on this casing 1 and equipped at the back with a fire chamber 3 and a number of movable elements 4 which are
5 moved backward during the recoil.

Said movable elements 4 include the slide 5 and the breech bolt 6 equipped at the front with a closing element 8 closing the chamber 3 during the shooting and
10 the extractor 9.

During the recoil of the movable elements 4, the case 10 is maintained in contact with the front side of the closing element 8 by means of the extractor 9 which has
15 a conventional design.

However, the design of the ejection device differs from that of conventional devices.

20 First, the closing element 8 is not equipped with a conventional ejector, but with a front side 11 which can make a relative movement, such that it does not provide for a sufficient tilting torque of the case 10 during the recoil of the movable elements 4, but such that it exerts
25 an axial effort on the case 10 guaranteeing its maintenance.

Said front side 11 consists of the far end of an element 12 which can move in a cavity 13 in the closing element
30 8. A spring 4 is mounted between the element 12 and the bottom of the cavity 13.

If this front side 11 covers a major part of the rear surface of the case 10, as is represented in figure 10,



the closing element 8 contains a rear stop 15, formed by a part of the bottom of the cavity 13, sufficient to support the back of the case as the pressure rises in the chamber 3.

5

The case 10 is thus axially maintained during the complete recoil of the movable elements and their return forward.

10 Secondly, an ejection lever 16 is mounted at the back of the chamber 3 which pivots in relation to the casing 1 around a transversal axis 17.

The ejection lever 16 contains a guiding element 18
15 through which goes a passage 19 for the case 10.

This ejection lever 16 can tilt between a lower position as represented in figure 3 and a higher position as represented in figures 1, 2 and 8.

20

In the lower position, the entry of the passage 19 is situated in the trajectory of the case 10 as the movable elements 4 return forward.

25 In this position, the passage 19 is directed slantingly upward.

The ejection lever 16 is pushed in its lower position by means of a spring 20 against a part of the casing 1
30 forming a stop.

In its higher position, the guiding element 18 is situated above the trajectory of the case 10; this case 10 can go under this guiding element 18 during the recoil



and thus during the extraction of the case 10.

In this higher position, the passage 19 opens above the gun 2.

5

Moreover, an ejection tube 21 is mounted on the casing 1 above the gun 2.

10 In said higher position, the ejection lever 16 stops against the rear end of the ejection tube 21, so that when a case is situated in the passage 19, it can be ejected in this ejection tube 21.

15 The rear end of the ejection tube 21 is provided with a non-return device 22, for example a valve, which prevents the case 10 from returning to the ejection lever 16 and stopping its operation, as represented in detail in figure 9.

20 This non-return device 22 can be easily realized by means of a deformable element, a flat spring or fragmentated membrane, etc.

25 This non-return device 22 can, apart from preventing the return, protect the inside mechanism of the fire arm in relation to the outside environment and prevent dust, sand, etc. from penetrating.

30 On the guiding element 18 is mounted a brake 23 to decelerate the movement of the case 10. This brake is composed of a lever 24 mounted in a pivoting manner on the guiding element 18 and it is pushed by a spring 25 in a position in which a block 26 mounted on a far end of the lever 24 penetrates inside the passage 19.



In order to be able to eject a case out of the passage 19, a button 27 is mounted on the slide 5. A front end of this button protrudes in relation to the slide 5 and penetrates the passage 19 when the movable elements 4 return forward.

Moreover, a split can be made in the guiding element 18 so as to allow for the passage of a part of the front end of the button 27.

10

When shooting, the movable elements 4 are situated in their foremost position and the ejection lever 16 is maintained in its higher position against the ejection tube 21, in opposition to the spring 20, by a stop 28 situated on one of the movable elements 4 (see figures 1 and 2).

15

During the recoil movement of the movable elements 4, the ejection lever 16 pivots around the transversal axis 17 as a result of the operation of the spring 20 up to its lower position in which it presents the entry of the passage 19 in the trajectory of the case 10 which is drawn in its rear position by the extractor 9, as represented in figure 3.

20

This case 10 comes forward, still being carried by movable elements 4.

The ejection lever 16, provided its rotation axis 17 and the walls of the guiding element 18 forming the contact ramps are in the right position, is pushed upward again as a result of the forward movement of the case 10, as represented in figure 4.

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During its pivoting movement, the ejection lever 16 forces the case 10 to pivot upward until the combined action resulting from the geometries of the front of the extractor 9 and of the front side 11 forming the ejector, ensures that the case 10 is released from the extractor 9, as represented in figure 5.

From that moment on, the case 10 is guided by the ejection lever 16 which the movable elements 4 continue to push back then, as represented in figure 6.

The case 10 is decelerated in the passage 19 of the ejection lever 16 by the brake 23 exerting a lateral force on the case 10.

15

At the end of the course of the ejection lever 16, the case 10 is pushed forward again outside the passage 19 by the button 27 which is carried along by the movable elements 4 and which forms a secondary ejector as represented in figure 7.

20

Once ejected out of the ejection lever 16, as represented in figure 8, whereby the ejection cycle can be considered as finished, the case 10 is driven from the ejection lever 16 at a level of the fire arm opening towards the exterior.

25

The ejection tube 21 makes it possible, for ergonomic reasons, to prolong the ejection, i.e. to bring the final ejection to the most appropriate place of the arm.

30

The succession of cases 10 pushing one after the other, ensures that the ejection tube 21 is emptied. The cases 10 remaining in the ejection tube 21 after the shooting



has stopped can simply come out of the tube as a result of the force of gravitation, by lowering the fire arm.

5 During the return of the movable elements 4 towards the front and thus the upward motion and the ejection of the case 10, the conventional feeding of the next cartridge is realized (pushing of the cartridge presented by the loader by means of the movable elements 4 and introduction into the chamber 3).

10

Thanks to the above-described ejection device, the case 10 which has not been ejected yet and the ejection lever 16 ensure a guiding ceiling to the fed cartridge, such that the risk of a miscarried feeding is strongly
15 reduced.

The ejection device does not only make it possible to eject empty cases, but also non-initialised cartridges.

20 The pivoting to the top of the ejection lever 16 must not necessarily be caused by any of the above-mentioned movable elements 4. It can be caused by another movable element or by any other element whatsoever which makes a relative movement in relation to itself.

25

It is clear that numerous modifications can be made to the above-described example while still remaining within the scope of the invention.

30 In particular, the gun must not necessarily be fixed in relation to the casing. The invention can be applied for example to a fire arm of the type whose gun is movable towards the front as is described in a patent application filed in Belgium in the name of the applicant.





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Claims.

- 5 1. Ejection device for a fire arm with an automatic or
manual cycle, whereby this fire arm contains a casing
(1), a gun (2) mounted on this casing (1) and which is
equipped with a fire chamber (3) and movable elements
(4) which can be moved backward in relation to the casing
10 (1) during the recoil, whereby the movable elements (4)
contain an extractor (9) to carry along a case (10)
during the recoil and an element (8) to close the chamber
(3), whereby the ejection device contains an ejector (12)
mounted in this closing element (8), characterized in
15 that the ejection device contains an ejection lever (16)
mounted in a pivoting manner around a transversal axis
(17) and containing a guiding element (18) provided with
a passage (19) for a case (10), whereby said ejection
lever (16) tilts between a lower position in which the
20 entry of its passage (19) is situated in the trajectory
of the case (10) as the movable elements (4) return
forward and a higher position, whereby a button (27) is
provided to eject the case (10) out of the passage (19)
as the ejection lever (16) gains its higher position.
- 25
2. Ejection device according to claim 1, characterized in
that
the button (27) is made in one piece with a movable
element (4).
- 30
3. Ejection device according to any of claims 1 and 2,
characterized in that it contains a spring (20) pushing
the ejection lever (16) towards its lower position.

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4. Ejection device according to any of the preceding claims, characterized in that, in the lower position of the ejection lever (16), the passage (19) is directed slantingly upward towards the front of the fire arm.

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5. Ejection device according to any of the preceding claims, characterized in that it contains means causing the tilting towards its higher position, whereby these means are formed of movable elements (4) as they return forward, either with the help of the case (10), or by making direct contact.

6. Ejection device according to any of the preceding claims, characterized in that it contains a brake (23) mounted on the ejection lever (16) to decelerate the movement of the case (10).

7. Ejection device according to claim 6, characterized in that the brake (23) contains a lever (24) mounted in a pivoting manner on the ejection lever (16) and which can penetrate with a block (26) in the passage (19), a spring (25) acting on this lever (24).

8. Ejection device according to any of the preceding claims, characterized in that the ejector (11) is formed of a movable front side of the closing element (8).

9. Ejection device according to claim 8, characterized in that the moveable front side is part of an element (12) which is mounted in a springy manner in a cavity (13) in the foremost end of the closing element (8).

10. Ejection device according to any of the preceding claims, characterized in that it contains an ejection

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tube (21) mounted on the casing (1), whereby the rear end of this tube is situated opposite to the passage (19) of the ejection lever (16) in the higher position.

- 5 11. Ejection device according to any of the preceding claims, characterized in that the ejection lever (16) is mounted in a pivoting manner on the casing (1).

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