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Fire arm with forward ejection or ejection brought to the fore-part of the fire arm. ✓

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The invention concerns a fire arm with an automatic or manual cycle, with a forward ejection of the casing or an ejection of the casing brought to the fore-part of the fire arm, whereby this fire arm contains a frame, a barrel
10 mounted on this frame and which is equipped with a fire chamber and mobile elements which can be moved backward in relation to the frame during the recoil, whereby the mobile elements contain an extractor to carry along a casing during the recoil and an element to close the fire chamber, whereby
15 the fire arm further contains an ejection device with an ejector mounted in this closing element, and guiding means for the casing which allow for the passage of the casing during the recoil of the mobile elements and thus for the extraction, but which make the casing tilt during the
20 ejection.

The invention in particular concerns what are called "bull pup" guns whereby the course of the mobile elements is integrated in the grip.

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As the ejection of the casing is advanced and the casing is deflected in the most appropriate direction by means of a deflector at the output of the ejection tube, the risk of any interference of the ejection trajectory of the casing
30 with the shooter, namely with his face, is suppressed.

Such arms are advantageous in that they are ambidextrous and thus compatible with left-handed shooters as well as right-handed shooters.

- 5 A known fire arm of this type is described in European patent No. 0.717.255.

In this arm, the guiding means of the ejection device consist of an ejection lever mounted in a swiveling manner
10 around an axis and containing a guiding part provided with a passage for a casing, whereby this ejection lever tilts between a lower position in which the entry of its passage is situated in the trajectory of the casing when the mobile elements return forward, and a top position, a button being
15 provided to eject the casing out of the passage when the ejection lever approaches its top position, whereby this button preferably forms a whole with one of the mobile elements.

- 20 What may happen with these arms, is that on the moment when the casing is tilted so as to be ejected forward, the extractor still catches the neck of the casing, thus hindering a normal ejection and a new feeding.

- 25 The invention aims to remedy this disadvantage and to make sure that the extractor releases the casing when it is tilted.

To this aim, the fire arm contains a lever mounted next to
30 the extractor in a swiveling manner on one of the other mobile elements, whereby this lever is provided with an

eccentric cam working in conjunction with the extractor mounted in a tilting manner, such that, when the lever swivels, this cam can make the extractor tilt and thus cause it to release the casing, whereby the frame is provided with
5 at least one control stop situated in the trajectory of the lever during the forward movement of the mobile elements, making the lever swivel during this movement as mentioned above at the moment when the casing must be released from the extractor.

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The lever can be mounted on the slide in a swiveling manner.

Preferably, means are provided to put the lever back into a
15 position, after said swiveling, in which the cam allows the extractor to return into the position in which it was situated prior to its tilting.

Said means for putting the lever back may contain a release
20 spring acting on the lever.

These means may also contain a return stop, fixed in relation to the frame, situated more to the front than said control stop.

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

figure 1 represents a schematic side view of a part of a fire arm according to the invention;

figure 2 represents a front view according to arrow F2 indicated in figure 1;

5 figure 3 represents a longitudinal section of the part of the fire arm from figure 1, but related to another position, i.e. at the moment of the ejection;

figures 4 to 10 represent a part of the section from figure 3 to a larger scale, but with reference to
10 different successive stages of the extraction and the ejection of the casing.

Figures 1 to 3 represent a part of a gas-operated fire arm and a rotating lock containing a frame 1, a barrel 2
15 mounted on this frame 1 and provided with a fire chamber 3 in the back, and a number of mobile elements 4 which move backward at the time of the recoil.

Said mobile elements 4 contain the slide 5, the breech bolt
20 6 provided with a locking element 7 at the front which closes the fire chamber 3 when a shot is fired, the extractor 8 and the firing pin 9.

This extractor 8 swivels over the slide 5 around a
25 transversal axis 8', whereby a spring 10 acts on the rear end pushing this extractor 8 into its extraction position as represented in figure 3.

A cam 11, mounted on a release lever 12, works in
30 conjunction with the rear part of said extractor 8 and can make it swivel against the spring 10.

This lever 12 is provided on the slide 5 and contains a transversal axis 13 swiveling in this slide 5. A return spring 14, which is mounted for example between a part of the slide and a flattened part of the axis 13, exerts a restoring torque on this axis 13 during its rotation.

The cam 11 is situated on one far end of the axis 13.

10 This lever 12 contains a top arm 15 and a lower arm 16 forming an obtuse angle between them, whereby, during the movement of the slide 5, these two arms work in conjunction with stops which are situated on the frame 1, namely, from the front to the back, a lower return stop 17, a top control
15 stop 18 and a pair of guiding stops 19 and 20.

The extractor 8 has a conventional design and its front end forms a hook 21 which can catch the neck of a casing 22, of a cartridge which has either or not been shot, situated in
20 the fire chamber 3, as represented in detail in figure 4.

These stops 17 to 20 are situated in a place such that, when the extractor 8 has to release an extracted casing 22 so as to allow for the ejection, the lever 12 is swiveled such
25 that the cam 11 makes the extractor 8 swivel, as will be explained in detail below.

The above-mentioned closing element 7 of the breech bolt 6 has a front side 23 and is intersected by an axial opening
30 24 for the firing pin 9.

In view of the ejection is provided an ejection device, containing an ejector, consisting of a button 25 with a spring 26, i.e. a trigger, and mounted in an opening 27 in the closing element 7, whereby the spring 26 pushes the
5 button 25 outward.

Apart from the above-mentioned ejector 25,26, the ejection device contains guiding means consisting of an ejection lever 28 and mounted in the back of the fire chamber 3.
10 This lever 28 swivels in relation to the frame 1 around a transversal axis 29 between a lower position represented in figure 3 and a top position represented in figure 1.

The ejection lever 28 contains a guiding part 30,
15 intersected by a passage 31 for the casing 22.

In the lower position, the entry of the passage 31 which is directed slantingly upward, is situated on the trajectory of the casing 22 when the mobile elements 4 return forward
20 again.

In the top position, the guiding part 30 is situated above the trajectory of the casing 22, whereby this casing 22 can go under said guiding part 30 as the casing 22 recoils and
25 is thus extracted.

In this top position, the passage 31 opens in an ejection tube 32 mounted on the frame 1, above the barrel 2.

30 In order to make it possible to eject a casing 22 outside the passage 31, a button 33 is mounted on the slide 5.

The extraction and forward ejection of a casing 22 in the above-described fire arm are in principle carried out in a known manner, as described for example in European patent
5 No. 0.717.255. Hence, the extraction and ejection will only be described hereafter as far as necessary in order to understand the invention and thus insofar as they differ from what is known.

10 At the moment of the shooting, the mobile elements 4 are situated in their front position and they recoil as a result of the shooting.

During the recoil movement of the mobile elements 4, the
15 hook 21 of the extractor 8 catches the neck of the casing 22.

As the ejector 25,26 is situated close to the extractor 8, the ejector 25,26 does not exert any significant torque on
20 the casing 22, which thus remains in its position against the front side 23 of the closing element 7 during the complete recoil of the mobile elements 4.

When the recoil begins, the top arm 15 of the lever 12
25 makes contact with the return stop 17, and the lever 12 is situated in the position as represented in figure 4.

The cam 11 does not act on the extractor 8, which remains in its extraction position.

At a given moment, the lower arm 16 makes contact with the control stop 18 which is situated lower and more to the back in relation to the return stop 17, on the trajectory of the arm 16, whereby this arm 16 is forced to swivel
5 towards the position as represented in figure 5 in order to pass this control stop 18.

Past this stop, the lever 12 swivels thanks to the effect of the return spring 14 into a rest position.

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At the end of the recoil, it is the top arm 15 which makes contact with the lower guiding stop 19 and which is guided in between the guiding stops 19 and 20. Possible oscillations of the lever 12 are stopped, and the lever 12
15 is forced into the position represented in figure 6.

After the recoil, the casing 22 comes forward again, still driven by the extractor 8 and the other mobile elements 4 and still in its position where it makes contact with the
20 above-mentioned front side 23.

As soon as the funnel formed by the guiding stops 19 and 20 comes out, the lever 12 goes back into its rest position thanks to the effect of the return spring 14.

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The trajectory which is then followed by the far end of the lower arm 16 during said return movement goes through the control stop 18, and when this arm 16 again hits the control stop 18, the lever 12 must swivel in the direction
30 indicated in figures 7 to 9 by the arrow 34, as the lever 12 is moved forward together with the slide 5.

It is clear that, when the lever 12 swivels, the cam 11 makes a circular movement around the swivel pin of the lever 12.

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During the above-mentioned swivel movements of the lever 12 during the recoil, as well as during the swivel movement between its position represented in figure 6 and its position represented in figure 7, the cam does not exert
10 any positive action whatsoever on the extractor 8.

Between the moment when the extractor 8 and the other mobile elements 4 are situated in the position represented in figure 7 and the moment when the extractor 8 and these
15 elements 4 are situated in the position represented in figure 8, the casing 22 enters the passage 31 of the ejection lever 28 which is in the meantime situated in its lower position as represented in figure 3.

20 The ejection lever 28 makes the casing 22 swivel towards the top until the coupled action resulting from the geometry of the front part of the extractor and of the ejector button 25 normally releases the casing 22 from the extractor 8 as represented in figure 8.

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Simultaneously, as a result of the swiveling of the lever 12, the cam 11 pushes the rear part of the extractor 8 back, making it swivel as represented in figures 8 and 9.

30 The extractor 8 has been maximally swiveled when the lever 12 is situated in the position represented in figure 8,

thus guaranteeing the complete release of the casing 22 as mentioned above.

5 As of this moment, the casing 22 is guided by the ejection lever 28 which is now going to be pushed back in its top position by the mobile elements 4, after which the casing 22 is pushed forward again outside the passage 31 and in the ejection tube 32 by the button 33 which is driven by the mobile elements 4.

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During the forward return of the mobile elements 4 and thus the lifting and the ejection of the casing 22, the next cartridge is fed in the conventional manner.

15 Before these mobile elements 4 reach their front position, the lever 12 is again swiveled in the direction opposite to the one indicated by the arrow 34. As a result, the cam 11 reduces the pressure on the extractor 8 and the latter starts to turn back into its original extraction position
20 due to the action of the spring 10.

It is not certain that, past the control stop 18, the above-mentioned return swiveling of the lever 12 can take place by the mere doing of the return spring 14.

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On the one hand, the swivel movement caused by the effect of the control stop 18 is relatively large, and, on the other hand, the lever 12 may jam as it is still swiveling slightly after the maximum swivel movement of the
30 extractor.

The return stop 17 makes sure that the lever 12 goes back into a position in which the cam 11 no longer holds the extractor 8 in a swiveled position.

5 Towards the end of the return movement of the mobile elements 4, the top arm 14 knocks against the return stop 17, as represented in figure 10.

10 The return stop 17 thus forces the lever 12 to return into its starting position as represented in figure 4, in which the cam 11 no longer exerts any pressure on the extractor 8, after which the above-described cycle can start again.

15 The lever 12 has for a result that the extractor 8 releases the casing 22 with absolute certainty when it actually must be ejected.

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

In particular, the barrel 2 must not necessarily be fixed in relation to the frame 1. The invention can for example be applied to a fire arm of the type with a mobile barrel.

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The fire arm must not necessarily be provided with guiding stops 19 and 20, and even the return stop 17 could possibly be omitted in the casing where the return spring 14 can guarantee the return of the lever 12 into its starting position at the end of the forward return of the mobile elements 4.

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Claims.

- 5 1. Fire arm with an automatic or manual cycle, with a forward ejection of the casing (22) or an ejection of the casing (22) brought to the fore-part of the fire arm, whereby this fire arm contains a frame (1), a barrel (2) mounted on this frame (1) and which is
10 equipped with a fire chamber (3) and mobile elements (4) which can be moved backward in relation to the frame (1) during the recoil, whereby the mobile elements (4) contain an extractor (8) to carry along a casing (22) during the recoil and an element (7) to close the fire
15 chamber (3), whereby the fire arm further contains an ejection device with an ejector (25,26) mounted in this closing element (7), and guiding means for the casing (22) which allow for the passage of the casing (22) during the recoil of the mobile elements (4) and thus
20 for the extraction, but which make the casing (22) tilt during the ejection, characterized in that this arm contains a lever (12) mounted next to the extractor (8) in a swiveling manner on one of the other mobile elements (4), whereby this lever (12) is provided with
25 an eccentric cam (11) working in conjunction with the extractor (8) mounted in a tilting manner, such that, when the lever (12) swivels, this cam (11) can make the extractor (8) tilt and thus cause it to release the casing (22), whereby the frame (1) is provided with at
30 least one control stop (18) situated in the trajectory of the lever (12) during the forward movement of the

mobile elements (4), making the lever (12) swivel during this movement as mentioned above at the moment when the casing (22) must be released from the extractor (8).

- 5 2. Fire arm according to claim 1, characterized in that the lever (12) is mounted in a swiveling manner on the slide (5).
3. Fire arm according to claim 1 or 2, characterized in
10 that means are provided to put the lever (12) back, after said swiveling, into a position in which the cam (11) makes it possible for the extractor (8) to return to its position before it tilts.
- 15 4. Fire arm according to claim 3, characterized in that said means for putting back the lever (12) contain a return spring (14) acting on the lever (12).
5. Fire arm according to claim 3 or 4, characterized in
20 that said means for putting back the lever (12) contain a return stop (17) which is fixed in relation to the frame (1), situated more to the front than the control stop (18).
- 25 6. Fire arm according to claim 5, characterized in that at least one guiding stop (19,20) is provided, fixed in relation to the frame (1) and which can work in conjunction with the lever (12) at the end of the recoil of the mobile elements (4).



7. Fire arm according to claim 5 or 6, characterized in that the lever (12) contains two arms (15 and 16) forming an obtuse angle between them, whereby the top arm (15) works in conjunction with the return stop (17) and the lower arm (16) works in conjunction with the control stop (18).
8. Fire arm according to any of the preceding claims, characterized in that the guiding means of the ejection device consist of an ejection lever (28) mounted in a swiveling manner around an axis (29) and containing a guiding part (30) provided with a passage (31) for a casing (22), whereby this ejection lever (28) swivels between a lower position in which the entry of its passage (31) is situated in the trajectory of the casing (22) when the mobile elements (4) return forward, and a top position, a button (33) being provided to eject the casing (22) out of the passage (31) when the ejection lever (28) approaches its top position, whereby this button (33) preferably forms a whole with one of the mobile elements (4).
9. Fire arm according to any of the preceding claims, characterized in that the ejector (25,26) is mounted on the closing element (7) near the extractor (8), such that it does not exert any significant torque on a casing (22) which is caught by the extractor (8).
10. Fire arm according to claim 9, characterized in that the ejector (25,26) contains a button (25) with a spring



(26), i.e. a trigger, mounted in an opening (27) in the closing element (7).

