

Maneuver cartridge device and self-loading firearm suitable for this purpose

Description

[0001] The invention relates to a maneuver cartridge device for use in a self-loading firearm, comprising a barrel extending from a chamber to a muzzle and having an intercepting device arranged on the muzzle side for intercepting a projectile.

[0002] European patent document EP 1 490 644 B1 discloses a maneuver cartridge device. The intercepting device serves to hold projectiles of live ammunition that might be inadvertently fired instead of maneuver cartridges during maneuvers if the safety regulations are not followed and if the safety devices are circumvented.

[0003] The intercepting device is normally integrated into the maneuver cartridge apparatus.

[0004] Especially in case of self-loading firearms with high firing rates of up to 1200 rounds per minute, it has been found that, if live ammunition is inadvertently fired, numerous shots might be fired before the user can react and stop the shooting.

[0005] With an eye towards the safety of users and their surroundings as well as with an eye towards preventing the self-loading firearm from being damaged or destroyed in the case of the inadvertent firing of live ammunition, it is the objective of the present invention to put forward a maneuver cartridge device that allows a self-loading firearm to be safely handled in case live rounds are inadvertently fired.

[0006] This objective is achieved according to the invention in that, with a maneuver cartridge device of the above-mentioned type, the barrel has a first section that adjoins the chamber as well as a first cross section that is adapted to the caliber of the projectile, and in that the barrel has a second section that adjoins the first barrel section as well as a second cross section that is larger than the first cross section.

[0007] In the maneuver cartridge device according to the invention, it is provided that, for maneuvers, the barrel of a self-loading firearm that is used with live ammunition is replaced with a "maneuver cartridge barrel". According to the invention, such a barrel has a first section that is "caliber-sized" (in other words, it allows the passage of a projectile of a live cartridge) and additionally, it has a second section that has a larger cross section than that of the first barrel section.

[0008] The first barrel section allows the passage of an unintentionally fired projectile so that it can travel from the chamber to the second barrel section. The enlargement of the cross section in the area of the second barrel section allows the propellant gases to overtake the projectile inside the second barrel section so that these gases are no longer available to the full extent to propel the projectile, as a result of which the projectile is not accelerated very much any more before reaching the intercepting device, thus striking with diminished impact. In this manner, as compared to a barrel that is continuously the size of the caliber, the kinetic energy of the projectile can be reduced by about 80% by the time it strikes the intercepting device.

[0009] The invention makes it possible to prevent the drawbacks that can be encountered with the constrictions that are found at the cartridge neck of a maneuver chamber and that are meant to prevent projectiles containing live ammunition from being loaded and fired. Due to the high kinetic locking energy of machine gun locking mechanisms, the risk exists that live cartridges that have been unintentionally loaded are nevertheless completely loaded when the projectiles are pressed into the cartridge neck and that the weapons loaded with these "press-loaded cartridges", along with the projectile that is supported towards the front, can nevertheless be fired, which could cause the cartridge to explode and damage the weapon as well as pose a considerable hazard to the user.

[0010] In contrast to this, within the scope of the invention, it is provided that a projectile leaves a chamber unhindered and, after passing through the first barrel section, it is only accelerated in the second barrel section to the smallest extent possible, and is finally intercepted by means of the intercepting device.

[0011] The second barrel section forms an expansion space for propellant gases. The cross section of the second barrel section is dimensioned so as to be larger than the caliber, in other words, it has a diameter that is preferably at least 1 mm, especially at least 2 mm, larger than the diameter of the first barrel section, which is just slightly larger than the rated caliber of the self-loading firearm, especially a machine gun.

[0012] For purposes of achieving the most effective possible reduction of the acceleration of the projectile, it is advantageous for the second barrel section to be longer than the first barrel section. In particular, it is preferable for the first barrel section to be several times shorter than the second barrel section.

[0013] In order for the second barrel section to be configured as long as possible and so as to create a correspondingly large expansion space for the propellant gases, it is preferable for the first barrel section to be as short as possible. However, it is preferable for the first barrel section to have a minimum length that is dimensioned in such a way that, when the maneuver cartridge has been inserted into the chamber, the tip of the maneuver cartridge does not extend into the second barrel section. This entails the advantage that, after the maneuver cartridge has been fired, its flanged cartridge tip, which expands radially outwards, can still be supported inside the first barrel section by the surface of the first barrel section. This prevents the cartridge tip from expanding into the second barrel section, something that might hinder the maneuver cartridge from being pulled out of the chamber.

[0014] The first barrel section can have a smooth surface or else a surface that is provided with grooves and lands.

[0015] It is especially preferable for the second barrel section to be hollow-cylindrical throughout, so that the propellant gases can flow along and past the entire circumference of a projectile that has been unintentionally fired.

[0016] A particularly preferred embodiment of the invention provides that the barrel has a gas outlet in the area of the second barrel section in order to drive a self-loading

mechanism of a self-loading firearm, and it provides that the intercepting device has an intercepting element with an intercepting surface that is arranged adjacent to the gas outlet so that the gas outlet can be blocked by a projectile that has been intercepted by the intercepting device. In particular, the gas outlet can be blocked by means of just a single projectile and, in less preferred embodiments, by means of two or three projectiles at the maximum. Blocking the gas outlet has the advantage that the self-loading operation of a self-loading firearm is interrupted. This is due to the fact that projectile material, for instance, lead, contained in the projectile that has been unintentionally fired is deformed when it strikes the intercepting element and the deformed material then blocks the gas outlet.

[0017] Advantageously, the intercepting surface of the intercepting element is arranged so as to be flush or at least essentially flush with a delimitation of the gas outlet on the muzzle side in order to implement a particularly reliable blocking function.

[0018] In the simplest case, the intercepting surface is smooth and especially circular. In order to intercept a projectile “more gently”, the intercepting surface can have a depression that serves to at least partially hold a projectile.

[0019] Preference is also given to arranging the intercepting element inside a part of the barrel located on the muzzle side (in contrast to the state of the art, in other words, not arranged outside of the barrel). The arrangement of the intercepting element inside the barrel makes it especially easy to position the intercepting surface described above next to a gas outlet in order to drive a self-loading mechanism.

[0020] In the simplest case, the intercepting element is attached to the barrel by means of a screwed connection, for instance, by means of a union nut. However, the intercepting element is or can be attached to the barrel by means of a maneuver-cartridge attachment that protrudes beyond the muzzle of the barrel or by means of a flash suppressor on the muzzle.

[0021] Another preferred embodiment provides that the intercepting device has a display element that can be moved relative to the barrel by means of a projectile, thus displaying that a projectile has been intercepted.

[0022] Preferably, the display element can be moved in the firing direction, so that the kinetic energy of a projectile can be utilized to move the display element. The display element entails the advantage that, in case of a malfunction, a user can immediately ascertain whether this malfunction can be traced back to the unintentional shooting of live ammunition while using the safety maneuver cartridge barrel.

[0023] In addition, when the causes of damage to the weapon or of a safety-relevant incident during shooting using maneuver ammunition are being investigated, such a display element constitutes a direct indicator of the unauthorized use of live ammunition with this safety maneuver cartridge barrel.

[0024] The invention also relates to a self-loading firearm, especially a machine gun, using a maneuver cartridge device of the type described above.

[0025] Additional features and advantages of the invention are the subject matter of the description below and of the drawings depicting preferred embodiments.

[0026] The drawings show the following:

[0027] Figure 1 a longitudinal sectional view of a first embodiment of a maneuver cartridge device with an empty chamber;

[0028] Figure 2 a longitudinal sectional view of a second embodiment of a maneuver cartridge device when a maneuver cartridge is used;

[0029] Figure 3 a view corresponding to Figure 2 when a live cartridge is used;

[0030] Figure 4 a longitudinal sectional view of an embodiment of an intercepting device showing a display element in the initial state; and

[0031] Figure 5 a view corresponding to Figure 4 showing the display element in the actuated state.

[0032] An embodiment of a maneuver cartridge device is shown in Figures 1 to 3 and it is designated there in its entirety by the reference numeral 10. The maneuver cartridge device 10 comprises a barrel 12 that extends from a chamber 14 to the muzzle side 16.

[0033] Approximately at the height of the chamber 14, there is a carrying handle 18 that is connected to the barrel 12. On the muzzle side, the maneuver cartridge device 10 has an intercepting device 20 for intercepting a projectile.

[0034] The barrel 12 has a first section 22 that adjoins the chamber 14 as well as a second section 24 that adjoins the first section 22. In particular, the barrel sections 22 and 24 are oriented concentrically with respect to each other.

[0035] The first barrel section 22 has a surface 26 with lands 28 and grooves 30. The surface 26 delimits a cross section 32 that is adapted to the rated caliber of a self-loading firearm for which the maneuver cartridge device 10 is intended. The first barrel section 22 with its surface 26 extends over a relatively short path. The first barrel section, however, is at least long enough that the tip 27 of a maneuver cartridge 45 (see Figure 2) that has been inserted into the chamber 14 does not extend into the second barrel section 24.

[0036] The second barrel section 24 has a preferably continuous cylindrical and smooth surface 34 that delimits a second cross section 36. The second cross section 36 has a diameter that is preferably at least 1 mm, especially at least 2 mm, larger than the diameter of the first cross section 32.

[0037] Preferably, the second cross section 36 is larger along the entire course of the second barrel section 24 than the first cross section 32 of the first barrel section 22.

[0038] The second barrel section 24 is several times longer than the first barrel section 22.

[0039] The intercepting device 20 of the maneuver cartridge device 10 according to Figure 1 has an intercepting element 38 that is integrated into a maneuver cartridge attachment 40. The maneuver cartridge attachment 40 is connected to the barrel 12 in the area of the muzzle 16.

[0040] The intercepting element 38 has an intercepting surface 42 that faces the chamber 14 and that is provided with a depression 44.

[0041] The maneuver cartridge device 10 is preferably color-coded. For maneuver operations, the maneuver cartridge device 10 is used instead of the original weapon barrel in a self-loading firearm. When maneuver cartridges are used, the propellant gases generated by a maneuver cartridge 45 are employed to discharge them at a gas outlet 46 of a gas-reduction means 48. The gas-reduction means 48 serves to drive a self-loading mechanism of the self-loading firearm, so that a series of maneuver cartridges can be automatically fired.

[0042] If the maneuver cartridge device 10 shown in Figure 1 is unintentionally operated with a live cartridge (reference numeral 49, see Figure 3), after a shot has been fired, the projectile/bullet of the live cartridge 49 passes through the caliber-sized first barrel section 22 and through the second, enlarged barrel section 24, ultimately dropping into the depression 44 of the intercepting element 38.

[0043] The intercepting device 20 of the maneuver cartridge device 10 according to Figures 2 and 3, in contrast to the intercepting device 20 shown in Figure 1, is modified in such a way that an intercepting element 50 is provided which is arranged inside the barrel 12.

[0044] As a result, the intercepting surface 42 of the intercepting element 50 is shifted further towards the chamber 14. In this context, it is provided that the intercepting surface 42 is arranged directly adjacent to a delimitation 52 of the gas outlet 46 on the

muzzle side. The shift of the intercepting surface 42 starting at the delimitation 52 in the direction of the muzzle 16 preferably ranges between approximately 0 mm and approximately 10 mm.

[0045] In order to ensure that a projectile is intercepted gently, preference is given to providing the intercepting surface 42 with a centrally arranged depression 44. For purposes of attaining the most reliable possible blocking of the gas outlet 46 by means of the projectile of a live cartridge 49, it is preferable for the intercepting surface 42 to be smooth and not to have any depression 44.

[0046] In order to affix the intercepting element 50 to the barrel 12, the intercepting element 50 has a radial widened segment 54 in the area of the muzzle 16, and this widened segment 54 cooperates with a ring-shaped holder 56 of the barrel 12. As seen in the firing direction towards the front, the intercepting element 50 is secured to the barrel 12 by means of the maneuver cartridge attachment 40.

[0047] During normal operation of the maneuver cartridge device 10 according to Figures 2 and 3 using maneuver cartridges, propellant gas is fed in via the gas outlet 46 of the gas-reduction means 48 and via a self-loading mechanism of the self-loading firearm that is familiar and thus not shown here. If a live cartridge 49 is unintentionally fired, the projectile passes through the barrel sections 22 and 24 and then, already at the height of the gas outlet 46 or shortly thereafter as seen in the firing direction, it strikes against the intercepting surface 42 of the intercepting device 50, as a result of which the projectile material is deformed and blocks the gas outlet 46. Consequently, the self-loading operation of the firearm is interrupted.

[0048] Figures 4 and 5 show another embodiment of an intercepting device 20 that comprises an intercepting element 38, 50. The intercepting element is provided with a depression 44 in the area of the intercepting surface 42.

[0049] Between the intercepting surface 42 and one end 58 of the intercepting device 20 facing away from the intercepting surface 42, there is an especially centrally arranged bore 60 that adjoins the depression 44 and opens up at the rear 62 of a display element 64.

The display element 64 is mounted so that it can be moved in the firing direction inside a guide bushing 66. The display element 64 has a display section 68 that passes through the guide bushing 66.

[0050] Starting at the initial position of the display element 64 shown in Figure 4, the impact of a projectile onto the intercepting surface 42 causes a deformation of the projectile, whereby at least parts of the deformed projectile act onto the rear 62 of the display element 64 via the depression 44 and the bore 60, so that the display element 64 is moved forward in the firing direction and the display section 68 is pushed out of the guide bushing 66 and is thus visible for a user from the side (see Figure 5).

Claims

1. A maneuver cartridge device (10) for use in a self-loading firearm, comprising a barrel (12) extending from a chamber (14) to a muzzle (16) and having an intercepting device (20) arranged on the muzzle side for intercepting a projectile, characterized in that the barrel (12) has a first section (22) that adjoins the chamber (14) as well as a first cross section (32) that is adapted to the caliber of the projectile, and in that the barrel has a second section (24) that adjoins the first barrel section (22) as well as a second cross section (36) that is larger than the first cross section (32).
2. The maneuver cartridge device (10) according to claim 1, characterized in that the second barrel section (24) is longer than the first barrel section (22).
3. The maneuver cartridge device (10) according to one of the preceding claims, characterized in that the first barrel section (22) has a minimum length that is dimensioned in such a way that, when the maneuver cartridge (45) has been inserted state into the chamber (14), the tip (27) of the maneuver cartridge (45) does not extend into the second barrel section (24).
4. The maneuver cartridge device (10) according to one of the preceding claims, characterized in that the second barrel section (24) is hollow-cylindrical.
5. The maneuver cartridge device (10) according to one of the preceding claims, characterized in that the barrel (12) has a gas outlet (46) in the area of the second barrel section (24) in order to drive a self-loading mechanism of a self-loading firearm, and in that the intercepting device (20) has an intercepting element (50) with an intercepting surface (42) that is arranged adjacent to the gas outlet (46) so that the gas outlet (46) can be blocked by a projectile that has been intercepted by the intercepting device (20).

6. The maneuver cartridge device (10) according to claim 5, characterized in that the intercepting surface (42) has a depression (44) that serves to at least partially hold a projectile.
7. The maneuver cartridge device (10) according to claim 5 or 6, characterized in that the intercepting element (50) is arranged inside a part of the barrel (12) located on the muzzle side.
8. The maneuver cartridge device (10) according to one of claims 5 to 7, characterized in that the intercepting element (50) is or can be attached to the barrel (12) by means of a maneuver-cartridge attachment (40) that protrudes beyond the muzzle (16) of the barrel (12).
9. The maneuver cartridge device (10) according to one of the preceding claims, characterized in that the intercepting device (20) has a display element (64) that can be moved relative to the barrel (12) by means of a projectile, thus displaying that a projectile has been intercepted.
10. A self-loading firearm, especially a machine gun, having a maneuver cartridge device (10) according to one of the preceding claims.