Cartridge

The invention relates to a cartridge having a projectile, and a case which is mounted on the projectile from behind and which has a case mouth at the front end, wherein the projectile has a tip, and at the rear this tip merges into a circumferential front guide band which defines the outside diameter of the projectile, and directly adjoining this front guide band in the direction of the projectile base, a circumferential case mouth receiving space which extends in the axial direction of the projectile and in which the case mouth engages is situated in the projectile.

This type of projectile is known from EP 1 774 251 B1.

~~The object~~Embodiments of the invention ~~is~~ seek to improve a cartridge ~~according to the preamble of Claim 1~~ in such a way that the twistless freebore is reduced to a minimum during firing. Likewise, the aim is to build up the gas pressure early. A further aim, among others, is to seal off the case mouth with respect to the projectile against any form of moisture.

~~This object is achieved according to the invention by the features of Claim 1.~~According to an aspect of the present invention, there is provided a cartridge having a projectile, and a case which is mounted on the projectile from behind and which has a case mouth at the front end, wherein the projectile has a tip, and at the rear this tip merges into a circumferential front guide band which defines the outside diameter of the projectile, and directly adjoining this front guide band in the direction of the projectile base, a circumferential case mouth receiving space which extends in the axial direction of the projectile and in which the case mouth engages is situated in the projectile, characterized in that an exposed

portion of the case mouth receiving space extending in the axial direction of the projectile is situated between the front guide band and the case mouth; i.e., the case mouth does not completely fill the case mouth receiving space in the direction of the nose of the projectile.

Due to an exposed portion of the case mouth receiving space which extends in the axial direction of the projectile being situated between the front guide band and the case mouth, i.e., the case mouth not completely filling the case mouth receiving space in the direction of the nose of the projectile, the front guide band is shifted forward toward the tip, as the result of which the twistless freebore ~~is~~ may be reduced to a minimum. In addition, a receiving space is thus created which may be filled with a

sealing means, thus sealing off the case mouth with respect to the projectile against any form of moisture.

It is thus preferred for the exposed portion of the case mouth receiving space to be sealed off with a sealing means, for example a lacquer.

In one embodiment, the projectile tip merges via one or more shapes into the front guide band, i.e., on the outside diameter of the projectile, in an ogival or conical manner. The transitional shape at the guide band from the tip to the guide band optimally has a conical shape at the angle of the transition cone of the cartridge chamber. The increase in the outside diameter of the projectile thus achieved can reduces the twistless freebore and builds up the gas pressure. The conical shape at the guide band brings about centering of the projectile with respect to the barrel bore axis. Centering produced in this way may results in improved precision.

The exposed portion of the case mouth receiving space may merge into the front guide band in a concave, convex, or linear manner. If the exposed portion of the case mouth receiving space merges linearly into the front guide band, this linear transition preferably extends at an angle of less than or equal to 16 degrees with respect to the projectile axis. This angle of ≤ 16° with respect to the projectile axis is preferred for aerodynamic reasons.

One embodiment is characterized in that from the radially lowest location in the case mouth receiving space, i.e., the field diameter or smaller, the shape of the projectile toward the rear transitions via one or more shapes to the diameter of the projectile or smaller in a concave, convex, or linear manner. The front guide band in the outside diameter of the projectile may allows a smaller design of the rear part of the projectile, since this part is not necessary for the pressure build-up. In addition, the barrel load (frictional resistance and associated barrel heating and barrel

deposits) ~~are~~ thus may also be reduced. The projectile ~~is~~ may be ideally shaped in such a way that it is suitable for sealing off the case mouth with respect to the projectile and for pinching the case mouth.

In one design, a receiving space containing a material that produces a tracer upon initiation is situated at the rear of the projectile. This is referred to as a tracer projectile or a tracer cartridge.

In one embodiment, a borehole which is coaxial with respect to the projectile axis is provided in the projectile, the borehole being open toward the projectile tip, and a projectile core made of tungsten or tungsten carbide is situated in the borehole, and the borehole is closed by a projectile tip insert made of titanium or zirconium, the outer shell of the projectile tip insert being a part of the tip of the projectile. This is referred to as an armor-piercing incendiary (API) projectile or API cartridge.

In principle, the embodiment with the guide band shifted to the front ~~is~~ may be transferable to other types of projectiles. Examples of other types of projectiles are armor-piercing (AP) projectiles, partial fragmentation projectiles, full metal jacket projectiles, monolithic projectiles, deformation projectiles, and others.

The invention is explained in greater detail below with reference to the figures.

Figure 1a shows a cartridge 10 according to the invention, and Figure 1b shows an enlarged detail A from Figure 1a. Figure 2 shows the projectile 11 according to Figures 1a and 1b, but without the case 12. Figure 3 shows the cross section of a cartridge 10 according to the invention that is inserted into a barrel 23 of a weapon. The same subject matter is denoted by identical reference numerals in all the figures.

Claims

1. A cartridge ~~(10)~~ having a projectile ~~(11)~~, and a case ~~(12)~~ which is mounted on the projectile ~~(11)~~ from behind and which has a case mouth ~~(13)~~ at the front end, wherein the projectile ~~(11)~~ has a tip ~~(1)~~, and at the rear this tip ~~(1)~~ merges into a circumferential front guide band ~~(4)~~ which defines the outside diameter of the projectile, and directly adjoining this front guide band ~~(4)~~ in the direction of the projectile base ~~(14)~~, a circumferential case mouth receiving space ~~(15)~~ which extends in the axial direction of the projectile ~~(11)~~ and in which the case mouth ~~(13)~~ engages is situated in the projectile ~~(11)~~, characterized in that an exposed portion ~~(16)~~ of the case mouth receiving space ~~(15)~~ extending in the axial direction of the projectile ~~(11)~~ is situated between the front guide band ~~(4)~~ and the case mouth ~~(13)~~; i.e., the case mouth ~~(13)~~ does not completely fill the case mouth receiving space ~~(15)~~ in the direction of the nose of the projectile ~~(11)~~.

2. The cartridge according to Claim 1, characterized in that the exposed portion ~~(16)~~ of the case mouth receiving space ~~(15)~~ is sealed off with a sealing means, for example a lacquer.

3. The cartridge according to Claim 1 or 2, characterized in that the projectile tip ~~(1)~~ merges via one or more shapes into the front guide band ~~(4)~~, i.e., on the outside diameter of the projectile, in an ogival ~~(2)~~ or conical manner.

4. The cartridge according to one of Claims 1 to 3, characterized in that the exposed portion ~~(16)~~ of the case mouth receiving space ~~(15)~~ merges into the front guide band ~~(4)~~ in a concave, convex, or linear manner.

5. The cartridge according to Claim 4, characterized in that the exposed portion ~~(16)~~ of the case mouth receiving space ~~(15)~~ merges linearly into the front guide band ~~(4)~~ at an angle of less than or equal to 16 degrees with respect to the projectile axis ~~(17)~~.

6. The cartridge according to one of Claims 1 to 5, characterized in that from the radially lowest location in the case mouth receiving space ~~(15)~~, i.e., the field diameter ~~(6)~~ or smaller, the shape of the projectile toward the rear transitions via one or more shapes to the diameter of the projectile or smaller in a concave, convex, or linear ~~(18)~~ manner.

7. The cartridge according to one of Claims 1 to 6, characterized in that a receiving space ~~(19)~~ containing a material that produces a tracer upon initiation is situated at the rear of the projectile ~~(11)~~.

8. The cartridge according to one of Claims 1 to 7, characterized in that a borehole ~~(20)~~, which is coaxial with respect to the projectile axis ~~(17)~~, is provided in the projectile ~~(11)~~, the borehole being open toward the projectile tip ~~(11)~~, and a projectile core ~~(20)~~ made of tungsten carbide is situated in the borehole ~~(20)~~, and the borehole ~~(20)~~ is closed by a projectile tip insert ~~(22)~~ made of titanium, the outer shell of the projectile tip insert ~~(22)~~ being a part of the tip ~~(1)~~ of the projectile ~~(11)~~.