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(54) **TRAINING PROJECTILE AND TRAINING CARTRIDGE**

(71) Applicant: **Saltech AG**, Daniken (CH)

(72) Inventor: **Andreas Stauffer**, Daniken (CH)

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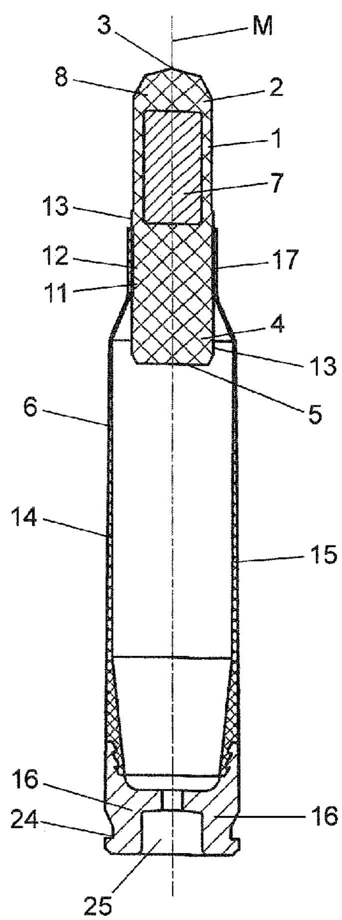
(57) **ABSTRACT**

The invention relates to a training projectile (**1**) for short-range use, in particular less than 100 meters, comprising a front region (**2**), which extends along a central axis (M) and which comprises a projectile tip (**3**), and comprising a tail region (**4**), which adjoins the front region (**2**) in the direction of the central axis (M) and which comprises a projectile end (**5**). The tail region (**4**) is designed for receiving the projectile (**1**) in a cartridge case (**6**). The projectile (**1**) comprises a projectile core (**7**) made of metal and a jacket (**8**) which surrounds the projectile core (**7**), determines the outer shape of the projectile (**1**), and is made of plastics.



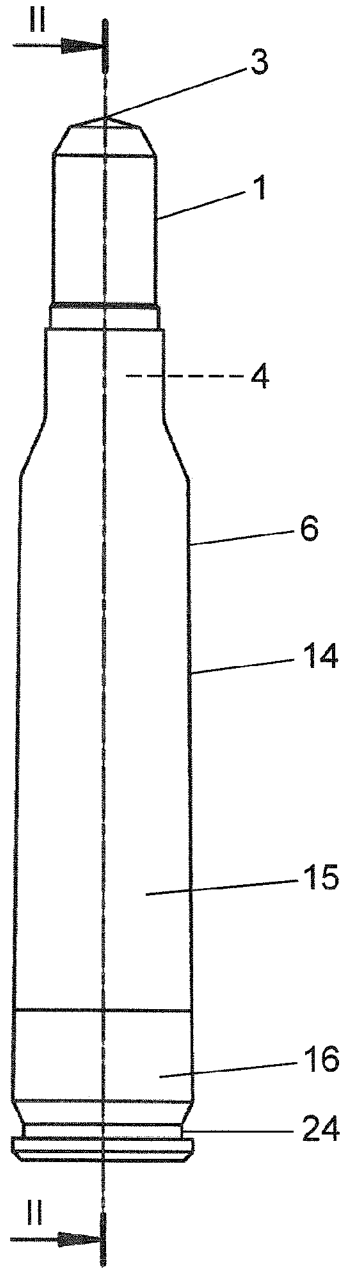


FIG. 1

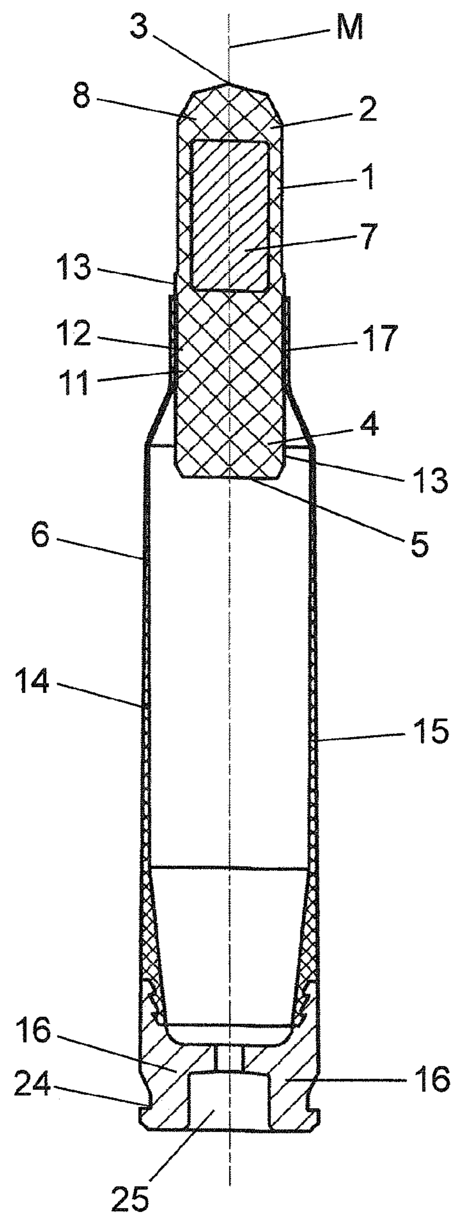


FIG. 2

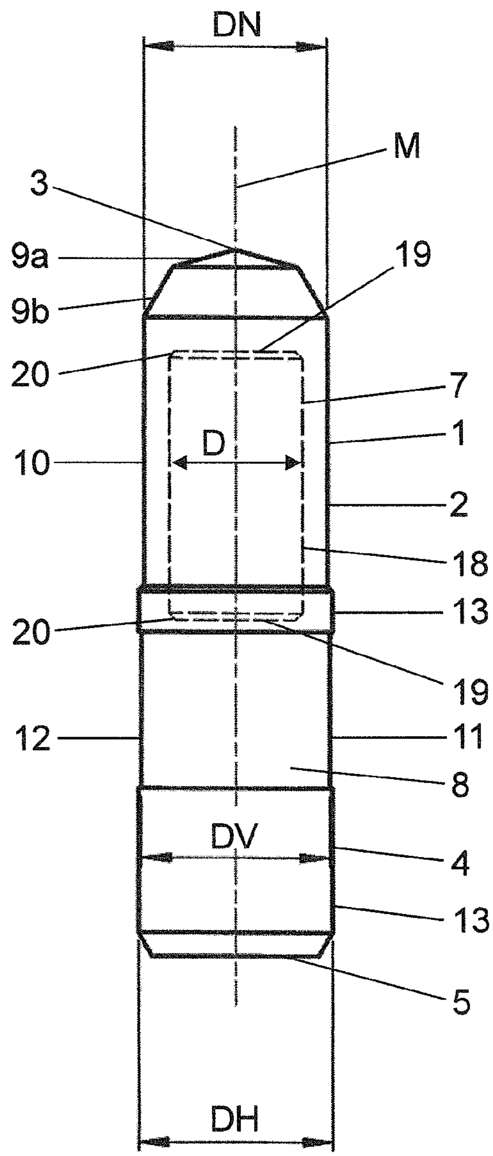


FIG. 3

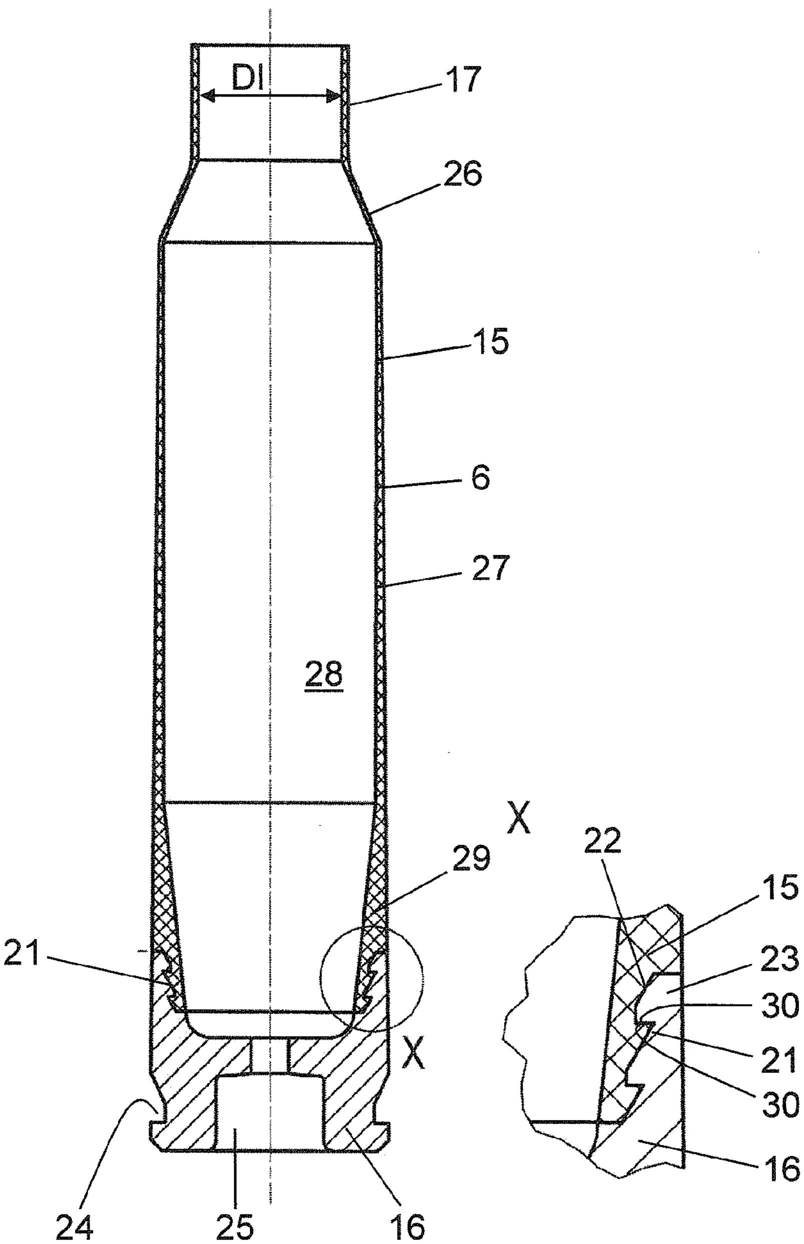


FIG. 4

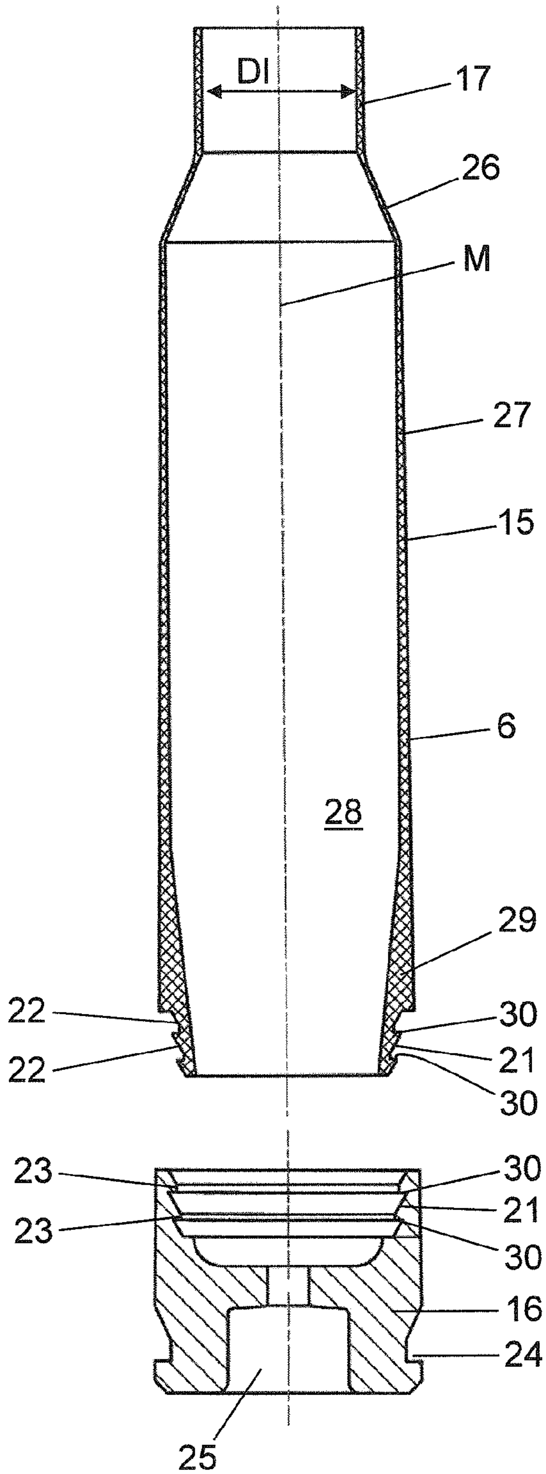


FIG. 5

TRAINING PROJECTILE AND TRAINING CARTRIDGE

TECHNICAL FIELD

[0001] The present invention relates to a training projectile for use over short distances, especially less than 100 meters, particularly preferably less than 50 meters, according to the preamble of claim **1** and a training cartridge with said training projectile as claimed in claim **10**.

PRIOR ART

[0002] Cartridge ammunition is known from the prior art. For example, the Swiss Army uses the rifle cartridge 90 (GP 90). NATO also uses very similar ammunition.

[0003] Such cartridges typically comprise a projectile or round, a cartridge case for storing the projectile and a propellant, and a percussion cap disposed in the base of the cartridge, by means of which the propellant can be suitably ignited so that the projectile can be suitably fired.

[0004] Both the projectile and the cartridge case consist of metallic materials in the case of the above-mentioned ammunition. For example, the projectile can be made of a lead alloy with a casing of brass alloy and the cartridge case consists of brass.

[0005] In the training mode such rounds have a series of disadvantages. On the one hand the costs of such rounds are relatively high because of the materials used. On the other hand, the materials are also partly problematic for the environment. Especially in the case of heavy metals, there are some circles of opinion that they pollute the earth at the training grounds, therefore expensive remedial measures are to be carried out when reconstructing such terrain structures.

[0006] Furthermore, training ammunition is known that causes adaptation of the weapon system. This is a disadvantage for the trainees, because the training conditions no longer correspond to the combat conditions. In addition, two different systems have to be maintained. On the one hand the weapon system for combat and on the other hand the weapon system for training.

DESCRIPTION OF THE INVENTION

[0007] Starting from said prior art, the object of the invention is to specify a training projectile for short distances that reflects combat conditions very realistically and at the same time is less costly to produce. Furthermore, the round should also be more environmentally friendly than the known rounds.

[0008] A training projectile as claimed in claim **1** achieves this objective. Accordingly, a training projectile for use over short distances, especially less than 100 meters, particularly preferably less than 50 meters, comprises a front region extending along a central axis with a tip of the projectile and a tail region adjoining the front region in the direction of the central axis with an end of the projectile, wherein the tail region is designed to accommodate the projectile in a cartridge case. Furthermore, the projectile comprises a projectile core of metal or a projectile core of a mixture of plastic and metal or a projectile core of solid or loose metallic powder and a plastic jacket surrounding the projectile core and at least partly determining the external shape of the projectile.

[0009] The projectile can thus have essentially three different embodiments.

[0010] According to a first embodiment the projectile comprises a projectile core of metal with a plastic jacket surrounding the projectile core and at least partly determining the external shape of the projectile. The projectile core is thereby intrinsically stable. It is thus preferably a solid projectile core.

[0011] According to a second embodiment, the projectile comprises a projectile core made of a mixture of plastic and metal with a plastic jacket surrounding the projectile core and at least partly determining the external shape of the projectile. It is e.g. conceivable here that there are metal parts in the plastic mixture, wherein the plastic mixture is used as a matrix for holding the metal parts.

[0012] According to a third embodiment, the projectile comprises a projectile core of solid or loose metallic powder with a plastic jacket surrounding the projectile core and at least partly determining the external shape of the projectile. The powder can be disposed loosely in the jacket, wherein an internal space in which the powder is disposed is provided by the jacket. The powder can, however, also e.g. be made into a solid composite by a sinter process, wherein said solid composite is then surrounded by the jacket.

[0013] Because of the formation of the projectile with a metallic or metal-containing core and a plastic jacket, a round can be provided that has very similar ballistic properties to conventional rounds. The metallic core thereby ensures a suitable weight, while the plastic jacket with the external shape determines the aerodynamics of the projectile.

[0014] The projectile core preferably has the shape of a cylinder. The projectile core can thus be particularly simply manufactured.

[0015] Preferably, the jacket completely surrounds the projectile core. This means that the projectile core is not externally visible. The jacket thereby determines the external shape of the projectile. In this way the metallic constituents are fully protected by the jacket and corrosion can even be prevented during storage.

[0016] Alternatively, the jacket partly surrounds the projectile core, wherein the projectile core preferably protrudes out of the jacket in the region of the tip of the projectile or forms the tip of the projectile, respectively. The projectile core can also be flush with a suitable surface of the jacket. In the case of said alternative embodiment the projectile core is partly externally visible and it can also be said that the projectile core is retained by the jacket. The external shape is only partly determined by the jacket here. The projectile core determines the external shape in the regions in which the projectile core is visible and the jacket determines the external shape in the regions in which the jacket is present.

[0017] In other words it can thus be said that the projectile core is at least partly surrounded by the jacket.

[0018] With respect to the completely surrounding jacket, it should be remarked that the round can also be used in a more environmentally friendly way, since no contact between the metal and the environment can occur because of the arrangement of the plastic jacket.

[0019] Looking from the tip of the projectile, the jacket preferably extends in the front region with a conical segment, preferably with two conical segments with different angles, and then transitions into a cylindrical segment. The tail region is preferably of an essentially cylindrical form.

[0020] The tail region preferably comprises a retaining segment with which the projectile can be mounted in a cartridge case. The retaining segment can be of different forms. In a first form the retaining segment is a recess that extends in the tail region and around the central axis, being bounded on both sides by the tail region. In a second form the retaining segment is formed by two elevations surrounding the projectile and extending outwards from the diameter of the tail region. In a third form the retaining segment is bounded by a single elevation surrounding the projectile and extending outwards from the diameter of the tail region. Said elevation will then be disposed in the interior of the cartridge case. Regardless of the arrangement of the recess or elevation, the retaining segment preferably has a slightly larger diameter in the region having contact with the cartridge case than the internal diameter of the cartridge case in the same region.

[0021] The projectile core is preferably disposed in the frontal region of the projectile when viewed in the firing direction. Alternatively, the projectile core is also centrally disposed between the tip of the projectile and the end of the projectile.

[0022] When viewed in the firing direction, the projectile core preferably has a length that is smaller by a factor in the range from 2 to 5, especially in the range from 2.5 to 4.5, than the total length of the projectile from the tip of the projectile to the end of the projectile in the direction of the central axis.

[0023] The projectile core preferably has a diameter that is smaller by a factor in the range from 1.1 to 1.8, especially by a factor in the range from 1.2 to 1.6, than the nominal diameter of the projectile.

[0024] The projectile core is made of a metal or a metal alloy selected from the group of steel and/or non-ferrous metals. It is particularly preferred if the projectile core is free of heavy metals. The jacket is made of a plastic selected from a thermoplastic or an elastomer or a plastic mixture selected from a thermoplastic and/or an elastomer.

[0025] Preferably, the projectile has a larger diameter in segments than the defined nominal diameter of the projectile. When passing through the barrel of a firearm the projectile, especially the plastic jacket, is hereby slightly compressed and is set in rotation about the central axis by the rifling.

[0026] A training cartridge comprises a projectile according to the above description and a cartridge case, wherein the cartridge case comprises a casing part and a base of the cartridge joined to the casing part, wherein at least the casing part is made of plastic. The projectile is retained by positive locking and/or non-positive locking in an accommodating segment in the casing part. Consequently, the projectile is thus essentially mechanically joined to the cartridge case. In other words, it can also be said that the projectile is plugged into the accommodating segment.

[0027] Alternatively, the projectile can be retained in the cartridge part by bonding. The accommodating segment is a zone with reduced material thickness here. The projectile is joined to the casing part by means of the zone with reduced material thickness by bonding, wherein said zone ruptures on ignition. The zone can also be referred to as a predetermined breaking point. In this development of the invention the projectile and casing part can be made in one manufacturing step. The projectile core can thereby be directly used in an injection molding process or can be inserted through the casing part in a later manufacturing step.

[0028] The design of the casing part and/or of the base of the cartridge of plastic has the advantage that an inexpensive cartridge case can be provided. In addition, the casing is more environmentally friendly than other metallic casings known from the prior art. The connection between the projectile and the cartridge case by means of positive locking and/or non-positive locking has the advantage that the resistance of the connection is simpler to dimension. Thus uncontrolled reactions or tearing off cannot occur during the ignition process.

[0029] The base of the cartridge is preferably retained in the casing part by positive locking, bonding and/or non-positive locking.

[0030] Preferably, the accommodating segment, in which the projectile is retained, has an internal diameter that is smaller than the external diameter of the projectile in the vicinity of the tail region, which is disposed in the accommodating segment. Consequently, a non-positive joint can be provided simply.

[0031] Preferably, at least one of said elevations, when viewed in the firing direction, is positioned behind the accommodating segment of the cartridge case, wherein said elevation has a diameter that is greater than the internal diameter of the accommodating segment. In this way a positive locking connection can be provided in relation to a displacement of the projectile from the casing. Said connection is removed during firing.

[0032] A combination between a positive locking and a non-positive locking connection is particularly advantageous in this case.

[0033] Preferably, the casing part and/or the base of the cartridge is/are made of a thermoplastic and/or of an elastomer or a suitable plastic mixture. The base of the cartridge can also be made of a metal, such as steel or a non-ferrous metal. Preferably, both the casing part and the base of the cartridge are free of heavy metals.

[0034] According to a method of manufacturing a training cartridge according to the above description,

- **[0035]** in a first step the projectile is joined to the casing part,
- **[0036]** in a second step the propellant is filled in the casing part and
- **[0037]** in a third step the casing part is joined to the base of the cartridge.

[0038] Depending on the embodiment, said projectile core is inserted into or filled in the projectile through the casing part between the first step and the second step.

[0039] According to an alternative method of manufacturing a training cartridge according to the above description,

- **[0040]** in a first step the base of the cartridge is joined to the casing part,
- **[0041]** in a second step the propellant is filled in the casing part and
- **[0042]** in a third step the casing part is joined to the projectile.

[0043] It is particularly preferred with both methods if an injection molding process is used for manufacturing the projectile and the casing part. In the case of the first method the projectile and the casing part can be directly joined to each other with the injection molding process by bonding. Plugging the projectile into the casing part is also conceivable, however. The base of the cartridge can also be manufactured by means of an injection molding process or in a different way.

[0044] Further embodiments are specified in the dependent claims.

BRIEF DESCRIPTION OF THE FIGURES

[0045] Preferred embodiments of the invention are described below using the figures, which are only used for explanation and are not to be interpreted as restrictive. In the figures:

[0046] FIG. **1** shows a side view of a training cartridge with a training projectile according to an embodiment of the present invention;

[0047] FIG. **2** shows a sectional view of FIG. **1**;

[0048] FIG. **3** shows a detailed view of the training projectile according to FIG. **1**;

[0049] FIG. **4** shows a detailed view of the cartridge case according to FIG. **1** with a detail X; and

[0050] FIG. **5** shows an exploded representation of FIG. **4**.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0051] In FIG. **1** a cartridge **14** is shown in a side view. The cartridge **14** comprises a training projectile **1** and a cartridge case **6**. The training projectile **1** can also be referred to as a projectile **1**. The training projectile **1** is mounted in the cartridge case **6**. The cartridge **14** shown in FIG. **1**, which can also be referred to as a training cartridge, is used as intended for exercises or for the training of armed forces. The training cartridge **14** is especially used for short distances, i.e. especially less than 100 m, particularly preferably less than 50 m. As the following description indicates, the training projectile **1** is, however, still a lethal round.

[0052] In FIG. **2** the cartridge **14** according to FIG. **1** is shown in a sectional representation, wherein here the structure of the training projectile **1** and the cartridge case **6** can be clearly identified.

[0053] The training projectile **1** comprises a front region **2** with a tip of the projectile **3** extending along a central axis M and an adjoining tail region **4** with one end of the projectile **5** in the direction of the central axis M. The tail region **4** is designed to accommodate the training projectile **1** in the cartridge case **6**.

[0054] The training projectile **1** comprises a projectile core **7** of metal and a jacket **8** of plastic surrounding the projectile core **7** and determining the external shape of the training projectile **1**. In other words, it can also be said that the training projectile **1** consists of metallic regions, in this case in the form of the core of the projectile **7**, and of regions of plastic, in this case in the form of the jacket **8**.

[0055] The projectile core **7** can be made of metal or of a mixture of metal and plastic or of loose or solid metallic powder. The projectile core **7** can thus be solid and have its own structure or can be in the form of a powder that is filled in the jacket.

[0056] In the embodiment according to the figures, the projectile core **7** is completely surrounded by the jacket **8**. In other embodiments that are not shown here, it is also conceivable that the jacket only partly surrounds the projectile core, so that the projectile core is externally visible and forms part of the external shape. For example, it would be conceivable that the front face **19** provides the tip of the projectile.

[0057] Using FIG. **3**, the design of the projectile **1** will now be explained in detail. The projectile core **7** is shown dashed in this figure. The projectile core **7** preferably has the shape of a cylinder. The cylinder extends with a circular cross-section along the central axis M and is bounded by a casing surface **18** and two end faces **19**. The transition between the casing surface **18** and the end face **19** can take place by means of a conical segment **20**. The conical segment **20** can also be referred to as a chamfer.

[0058] In FIG. **3** it can further be clearly seen that the plastic jacket **8** completely surrounds the projectile core **7** in this embodiment. The casing surface **18** and the end faces **19**, as well as possibly the chamfer, are thus completely covered by the jacket **8**.

[0059] The jacket **8** comprises a conical segment **9** in the front region **2** when viewed from the tip of the projectile **3**. The conical segment **9** comprises two conical regions **9***a* and **9***b* with different angles in the present embodiment. When viewed relative to the central axis M the first conical segment **9***a*, which directly adjoins the tip of the projectile **3**, has in this case a less acute angle than the conical segment **9***b* that adjoins the conical segment **9***a*. After the conical segment **9** or the conical segments **9***a*, **9***b*, respectively, the jacket **8** transitions into a cylindrical segment **10** that extends along the central axis M.

[0060] The tail region **4** adjoins the front region **2**, being likewise of cylindrical form. In the present embodiment the tail region **4** has different diameters as explained below.

[0061] In relation to the conical form of the training projectile **1** in the front region **2**, it should be noted that this is only one possible embodiment. Alternatively, the conicity can be omitted, wherein the round would then have an end face lying perpendicular to the central axis M or the front region can be of ogival, i.e. slightly rounded, form.

[0062] The tail region **4** is as already explained of essentially cylindrical form and comprises in this case different segments with different diameters. The retaining segment **12** associated with the tail region **4** is such a segment. The projectile **1** is mounted with the retaining segment **12** in the cartridge case **6**. For this purpose the cartridge case **6** comprises an accommodating segment **17**. The retaining segment **12** can be of a different form. In the present embodiment according to FIG. **3** the retaining segment **12** comprises a recess **11** extending in the tail region **4** and extending circumferentially about the central axis M. Said recess is bounded by elevations **13** on both sides when viewed relative to the central axis M. Said elevations **13** essentially define the external diameter DH of the tail region **4**. In other words, it can also be said that the recess **11** is bounded on both sides by the tail region **4**. The recess **11** has a diameter DV that is smaller than the diameter DH of the tail region **4**. One of the two elevations **13** is thereby disposed in the interior **28** of the cartridge case **6** and the other of the two elevations **13** is disposed outside of the cartridge case **6**. Both elevations preferably directly adjoin the accommodating segment **27**.

[0063] In other words, it can also be said that the retaining segment **12** is bounded by two elevations **13** surrounding the projectile **1** and extending outwards from the diameter of the tail region **4**. In this case the structure is essentially identical to the above-described exemplary embodiment with the recess **11**.

[0064] In an alternative embodiment, the retaining segment **12** can be bounded by a single elevation **13** surrounding the projectile **1** and extending outwards from the diameter of the tail region **4**. In this case the elevation **13** is in the region of the end of the projectile **5**. This means that the elevation **13** between the tail region **4** and the front region **2** would be omitted in this embodiment.

[0065] In principle this is to say that the diameter DV of the region that protrudes into the accommodating segment **17** of the cartridge case **6** is smaller than that part that, when viewed from the accommodating segment **17**, extends along the central axis M into the cartridge case **6**. The latter part is the segment with the diameter DH, being disposed close to the end of the projectile **5**. The diameter DV is thus smaller than the diameter DH. This can accordingly be seen in FIGS. **2** and **3**. This enlargement has the advantage that the projectile **1** provides a certain resistance during ignition of the ignition means present in the cartridge case **6**.

[0066] The projectile core **7** is, when viewed in the firing direction, preferably disposed in the forward region of the projectile **1**. In other words, the projectile core **7** is thus preferably disposed in the front region **2** and extends no more than partly into the tail region **4**. This is a particularly good arrangement in relation to the ballistic properties over a short distance.

[0067] Alternatively, the projectile core **7** can also extend further into the tail region **4**, whereby the ballistic properties can be changed. For example, it would be conceivable to dispose the projectile core **7** centrally between the tip of the projectile **2** and the end of the projectile **5**.

[0068] When viewed in the firing direction or in the direction of the central axis M, respectively, the projectile core **7** has a length that is smaller by a factor in the range from 2 to 5, especially in the range from 2.5 to 4.5, than the total length of the projectile **1** from the tip of the projectile **2** to the end of the projectile **5**.

[0069] The projectile core **7** also has a diameter D that is smaller by a factor in the range from 1.1 to 1.8, especially by a factor in the range from 1.2 to 1.6, than the nominal diameter DN of the projectile. The nominal diameter DN of the projectile means the diameter of the front region **2** in the present context.

[0070] In relation to the diameters, it should also be noted that the diameter DH in the tail region **4** is greater than the diameter DN in the front region **2**. The diameter DN, i.e. the nominal diameter, essentially corresponds to the diameter of the barrel with which the projectile **1** is accordingly intended to be used. The enlargement of the tail diameter DH has the advantage in this case that the plastic jacket is slightly compressed in this region by the passage through the barrel and the training projectile **1** is accordingly set into rotation by the rifling. The round preferably has a nominal diameter DN in the range from 4 to 10 mm.

[0071] In other words, it can also be said that in segments the profile **1** has a larger diameter DH than the defined nominal diameter DN of the projectile **1**. The diameter DH is particularly preferably larger than the nominal diameter DN by a factor in the range from 1.05 to 1.1.

[0072] The projectile core **7** is preferably made of a metal or of a metal alloy selected from steel and/or non-ferrous metals. The jacket is preferably made of a plastic selected from a thermoplastic or an elastomer or a plastic mixture selected from a thermoplastic and/or an elastomer.

[0073] Said materials are particularly environmentally friendly materials. It is particularly preferred if all parts are free of heavy metals.

[0074] It can easily be seen from FIG. **2** that the cartridge case **6** comprises a casing part **15** and a base of the cartridge **16** joined to the casing part **15**. Preferably, the casing part **15** is made of plastic and the base of the cartridge **16** is made of metal.

[0075] The projectile **1** is joined by positive locking and/or non-positive locking to an accommodating segment **17** of the casing part **15**. In other words, it can also be said that the projectile **1** is retained in the casing part **15** by means of positive locking and/or non-positive locking in an accommodating segment **17** of the casing part **15**.

[0076] The base of the cartridge **16** is retained in the casing part **15** by means of positive locking, bonding and/or non-positive locking.

[0077] In the present embodiment it can be seen in FIGS. **4** and **5** that the casing part **15** and the base of the cartridge **16** comprise a latching structure **21**. The latching structure **21** comprises a plurality of circumferential grooves **22** on the casing part **15** and elevations **23** on the base of the cartridge **16**.

[0078] Elevations **23** engage in the recesses **22** and thus retain the base of the cartridge **16** on the casing part **15**.

[0079] The structure of the elevations **23** and recesses **22** is selected in this case so that a force opposite to the firing direction is transferred from the base of the cartridge to the casing part **15**, so that after firing the cartridge case **6** can be ejected from the cartridge chamber of the weapon. For this purpose the base of the cartridge comprises a circumferential extraction groove **24**. At least one mating consisting of an elevation **23** and a recess **22** comprises a contact surface **30** extending essentially at right angles to the central axis M. A suitable force can be transferred from the base of the cartridge **16** to the casing part **15** during the process of extraction by means of said contact surface **30**. Two contact surfaces **30** are provided in the present embodiment. The contact surfaces **30** are thereby disposed separated from each other in the direction of the central axis M and surround the central axis M as annular surfaces.

[0080] The base of the cartridge **16** is preferably made of a metallic material or of plastic and comprises in addition a receptacle **25** for a percussion cap.

[0081] The accommodating segment **17**, in which the projectile **1** is retained, preferably has a diameter DI that is smaller than the external diameter DN of the projectile in the tail region **4**, which protrudes into said accommodating segment **17**. The projectile is thus suitably retained or clamped in the accommodating segment **17**. Said non-positive clamping joint is thereby provided by the elevation **13** or the recess **11**, respectively, in addition to or alternatively to the above-described positive locking connection. It can thus be said that on the one hand the projectile **1** is retained by a clamped connection and/or on the other hand is secured in the accommodating segment **17** by means of the elevation **13**. The elevation **13** and/or the enlarged external diameter DV in the tail region **4** thereby provide a resistance in the event of ignition of the propellant in the cartridge case **6**, so that a suitable pressure can build up before the projectile **1** exits the cartridge case **6**.

[0082] When viewed in the firing direction, the accommodating segment **17** preferably comprises a length that essentially corresponds to the length of the retaining segment **12**.

[0083] The cartridge case **8**, especially the casing part **15**, is made of a plastic, especially of a thermoplastic or an elastomer, or a plastic mixture of a thermoplastic and/or an elastomer.

[0084] Using FIGS. **4** and **5** the shape of the casing part **15** will be described from now on. From the accommodating segment **17** the casing part **15** extends across a conical segment **26** to a cylindrical segment **27**. The latching structure **21** adjoins the cylindrical segment **27**. The cylindrical segment **27** preferably extends with a constant external diameter and a constant internal diameter, so that the casing part **15** has a constant wall thickness in said region. The wall thickness in the rear region is selected to be slightly greater towards the latching structure **21**, so that here the interior **28** narrows conically along the central axis M towards the base of the cartridge **16**. This design has the advantage that a greater resistance can be provided during the ignition process. The correspondingly thickened region has the reference character **29**.

[0085] In an advantageous manufacturing method the projectile core is inserted into an injection molding machine and then encapsulated by the jacket, whereby the training projectile can be produced. Alternatively, the projectile core can also comprise an opening into which the projectile core is inserted or filled during manufacturing. The latter is especially advantageous if the projectile core is in powder form.

[0086] The cartridge case can equally be manufactured wherein the base of the cartridge is initially inserted into the injection molding machine and then the casing part is injection molded. Alternatively, the base of the cartridge can also be pressed into the cartridge case.

[0087] The training projectile and the cartridge case can, however, also be injected together, wherein the accommodating segment **17** is formed between the training projectile and cartridge case as a zone with reduced material cross-section.

[0088] Depending on the embodiment, the cartridge case is filled with a propellant, such as ignition powder, before the assembly of the projectile or before the assembly of the base of the cartridge.

[0089] Furthermore, a percussion cap is inserted in the receptacle **25**.

[0090] In summary, it can be said in relation to the present invention that because of the design of the training projectile **1** of metal and plastic, a projectile can be provided that has a lower soil contamination effect in comparison with rounds of lead. The same applies to the cartridge case **6**.

[0091] Furthermore, because of the design of the cartridge **14** per se, i.e. the shape of the projectile **1** and the cartridge case **6**, a cartridge can be provided that can be used in conventional weapon systems. Another advantage of said projectile is made of the fact that the projectile can be produced more cheaply than combat ammunition, which is also very welcome.

REFERENCE CHARACTER LIST	
1	training projectile
2	front region
3	tip of the projectile
4	tail region
5	end of the projectile
6	cartridge case
7	projectile core
8	jacket
9	conical segment
10	cylindrical segment
11	recess
12	retaining segment
13	elevations
14	cartridge
15	casing part
16	base of the cartridge
17	accommodating segment
18	casing surface
19	end face
20	conical segment
21	latching structure
22	grooves

-continued

REFERENCE CHARACTER LIST	
23	elevations
24	extraction groove
25	receptacle
26	conical segment
27	cylindrical segment
28	interior
29	thickened region
30	contact surface

1.-**19**. (canceled)

20. A training projectile for use over a distance, less than 100 meters, the training projectile comprising:

a front region extending along a central axis with a tip of the projectile and

a tail region adjoining the front region in a direction of the central axis with an end of the projectile,

wherein the tail region is designed for accommodating the projectile in a cartridge case,

a projectile core made of metal or a projectile core made of a mixture of plastic and metal or a projectile core made of solid or loose metallic powder and

a jacket made of plastic surrounding said projectile core and at least partly determining an external shape of the training projectile.

21. The training projectile as claimed in claim **20**, wherein the projectile core has a shape of a cylinder.

22. The training projectile as claimed in claim **20**, wherein the jacket completely surrounds the projectile core.

23. The training projectile claimed in claim **20**, wherein the jacket partly surrounds the projectile core, wherein the projectile core, in the region of the tip of the projectile, protrudes out of the jacket.

24. The training projectile as claimed in claim **20**, wherein the projectile core is flush with the outside of the jacket in segments.

25. The training projectile as claimed in claim **20**, wherein the jacket, when viewed from the tip of the projectile, extends with at least one conical segment in the front region and then transitions into a cylindrical segment and wherein the tail region is essentially of cylindrical form.

26. The training projectile as claimed in claim **20**, wherein the tail region comprises a retaining segment with which the projectile can be mounted in the cartridge case, wherein the retaining segment is a recess extending in the tail region and about the central axis, which is bounded on both sides by the tail region;

or wherein the retaining segment is bounded by two elevations surrounding the projectile and extending outwards from a diameter of the tail region;

or wherein the retaining segment is bounded by one elevation surrounding the projectile and extending outwards from the diameter of the tail region.

27. The training projectile as claimed in claim **20**, wherein the projectile core, when viewed in a firing direction along the central axis, is disposed in the front region of the projectile, or wherein the projectile core, when viewed in the firing direction along the central axis, is disposed centrally between the tip of the projectile and the end of the projectile.

28. The training projectile as claimed in claim **20**, wherein the projectile core has a length in a firing direction that is smaller by a factor in the range from 2 to 5, than the total length of the projectile from the tip of the projectile to the end of the projectile when viewed in the direction of the central axis and/or wherein the projectile core has a diameter that is smaller by a factor in the range from 1.1 to 1.8 than the nominal diameter of the projectile.

29. The training projectile as claimed in claim **20**, wherein the projectile core is made of a metal, such as steel or a non-ferrous metal, or of a metal alloy with steel and/or non-ferrous metals, and wherein the jacket is made of a plastic, especially of an elastomer or thermoplastic, or of a plastic mixture, especially of elastomers and/or thermoplastics.

30. The training projectile as claimed in claim **20**, wherein the projectile has a larger diameter in segments than a defined nominal diameter of the projectile, wherein the diameter is particularly preferably greater by a factor in the range from 1.05 to 1.1 than the nominal diameter.

31. A training cartridge comprising a projectile as claimed in claim **20** and a cartridge case, wherein the cartridge case comprises a casing part and a base of the cartridge joined to the casing part, wherein at least the casing part is made of plastic and wherein the projectile is retained in an accommodating segment in the casing part by means of positive locking, non-positive locking, and/or bonding.

32. The training cartridge as claimed in claim **31**, wherein the base of the cartridge is retained in the casing part by means of positive locking, bonding, and/or non-positive locking, and/or wherein the base of the cartridge is made of metal and/or plastic and the receptacle acts as an ignition cap.

33. The training cartridge as claimed in claim **31**, wherein the accommodating segment in which the projectile is retained has an internal diameter that is smaller than the external diameter of the projectile in a vicinity of the tail region, which is disposed in said accommodating segment.

34. The training cartridge as claimed in claim **31**, wherein at least one of said elevations, when viewed in a firing direction, is disposed after the accommodating segment in the cartridge case, wherein said elevation has a diameter that is larger than an internal diameter of the accommodating segment.

35. The training cartridge as claimed in claim **31**, wherein the accommodating segment, when viewed in a firing direction, has a length along the central axis that corresponds to a length of the retaining segment.

36. The training cartridge as claimed in claim **31**, wherein the casing part and/or the base of the cartridge is made of a material selected from the group of elastomers and/or thermoplastics.

37. The training cartridge as claimed in claim **31**, wherein the accommodating segment is a zone with reduced material thickness, the projectile being joined to the casing part by means of said zone by bonding, wherein said zone ruptures on ignition.

38. A method for manufacturing a training cartridge as claimed in claim **31**, wherein in a first step the projectile is joined to the casing part, wherein in a second step the propellant is filled in the casing part and wherein in a third step the casing part is joined to the base of the cartridge.

39. The method as claimed in claim **38**, wherein between the first step and the second step said projectile core is inserted or filled into the projectile through the casing part.

40. The method for manufacturing a training cartridge as claimed claim **31**, wherein in a first step the base of the cartridge is joined to the casing part, wherein in a second step the propellant is filled in the casing part and wherein in a third step the casing part is joined to the projectile.

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