

DESCRIPTION

Cartridge

5 The invention relates to a cartridge having a propellant charge casing which is at least partially filled with propellant charge powder and having a projectile part which is connected to the propellant charge casing at the front end.

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In cartridges such as these, the propellant charge casing normally comprises a casing cover, a casing sheath and a casing base composed of metal, wherein the casing sheath, which is composed of a combustible
15 material, is connected on the one hand via the casing cover to the projectile part and on the other hand via a spring plate and a locking ring to the casing base.

Propellant charge casings of the type mentioned above
20 can be used both for live cartridges and for practice cartridges.

A relatively low projectile weight is also a critical factor, in addition to the production of a projectile
25 which is as cost-effective as possible, in particular for the production of a cost-effective kinetic-energy practice munition. A reduced projectile weight also makes it possible to greatly reduce the propulsion power and the amount of propellant charge power. A
30 greatly reduced amount in the drive volume means, however, an uneven distribution of the poured powder in the cartridge after loading, if the composition volume remains the same. This is associated with undesirable pressure waves during ignition.

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The invention is based on the object of avoiding the disadvantage mentioned above.

According to the invention, this object is achieved by the features of claim 1. Further particularly advantageous refinements of the invention are disclosed in the dependent claims.

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The invention is essentially based on the idea of centering the propellant charge powder in the composition space both radially and in the axial direction of the cartridge. However, the aim in this case is to be less reliant on fillers or composition disks as a composition aid and in fact to use a type of powder sack or bag which holds and centers the propellant charge. Fillers have the disadvantage that, if they are composed of expanded polystyrene, they develop hydrochloric acid on combustion in the barrel, or, if composed of wadding, can become attached to the fin assembly after firing. The use of composition disks also results in the disadvantage that the disks must be attached by means of adhesive.

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Bag charges for holding propellant charges are known per se, in particular for modular propellant charges. However, their purpose and design etc. are based on factors other than those proposed here. The propellant bag charges are supplied to a weapon system separately from a projectile, as is evident, inter alia, from DE 198 21 050 A1. DE 198 52 360 C2 discloses the arrangement of these bag charges in a weapon barrel. A method and an apparatus for handling propellant charges which can be combined are disclosed in DE 697 21 037 T2.

DE 72 34 535 U1 discloses a propellant charge casing in the form of a folding bag. This reproduces the shape of the casing and is folded up over the propellant charge with which it has been filled, is welded, and is pushed into the casing mouth.

According to the invention, a (stretched) container (powder sack) which is in the form of a sack and is in each case completely filled with the appropriate amount of propellant charge powder is arranged in the propellant charge casing proposed here, such that the container - and therefore also the propellant charge powder - extends in the direction of the central longitudinal axis of the cartridge, in which case the longitudinal axis is simultaneously the axis of symmetry of the container which is in the form of a sack.

In a development of the invention, the end area at the base end of the container which is in the form of a sack is likewise attached to the casing base of the propellant charge casing by means of a spring plate, and the end area at the projectile end of the container which is in the form of a sack is attached to a composition aid which is preferably composed of a plastic which can be sprayed, and extends at right angles to the longitudinal axis of the cartridge, and whose external circumference is connected in a force-fitting and/or interlocking manner to the casing sheath and/or to the casing cover of the propellant charge casing. The bag is thus stretched and forms a type of inner casing.

In one advantageous embodiment of the invention, the composition aid is in the form of a cap and has a hemispherical outward bulge, which extends in the direction of the projectile part, is axially adjacent to the container which is in the form of a sack, and has a flat edge area which surrounds the outward bulge and is connected in an interlocking and/or force-fitting manner at the end to the casing sheath and/or to the casing cover.

In order to attach the container, which is in the form of a sack, to the composition aid, at least two opposite recesses in the form of slots are advantageously provided in the junction area between
5 the hemispherical outward bulge and the flat edge area, through which recesses two front areas, which are in the form of tabs and are axially separated from one another, of the container which is in the form of a sack are passed and are connected to the spherical
10 outward bulge at the front end.

In this case, the two end areas, which are in the form of tabs, of the container which is in the form of a sack can be knotted to one another or can be adhesively
15 bonded to the hemispherical outward bulge.

It has been found to be particularly advantageous for the end attachment of the composition aid to be provided in the junction area between the casing sheath
20 and the casing cover, since the composition disk then also assists the durability of the connection between the casing sheath and the casing cover.

The composition aid can itself be integrated in the
25 propellant charge casing, and snaps into the casing cover. It is used as an interlock between the casing and the casing cover, both of which are held firmly by a plug or the like. The bag can be filled from the top or bottom. The casing cover, preferably composed of a
30 plastic, has at least one guide band with weak points as well as undercuts, behind which the composition aid can snap in.

Alternatively, according to the object of the
35 invention, centering can be achieved by a further casing (second casing sheath) with a narrower diameter than the projectile casing. The second narrower casing

is in this case intended for the propellant charge. The constant diameter improves the internal ballistics.

Further details and advantages of the invention will
5 become evident from the following exemplary embodiments which are illustrated with reference to figures, in which:

Figure 1 shows a longitudinal section through a first
10 exemplary embodiment of a cartridge according to the invention with a container which holds propellant charge powder and is in the form of a sack, and a composition aid which has a hemispherical outward bulge;

15 Figure 2 shows an enlarged detail of the area annotated II in Figure 1;

Figure 3 shows a side view of a container which is in
20 the form of a sack and is illustrated enlarged, before being fitted into the cartridge;

Figure 4 shows a front view of a composition aid,
25 likewise before it is fitted into the cartridge according to the invention, and

Figure 5 shows a perspective illustration of the
30 casing cover shown in Figure 1.

In Figure 1, 1 denotes a practice cartridge according to the invention, which has a propellant charge casing 2 and a discarding sabot projectile 3 which is attached to the propellant charge casing 2 at the front end. The
35 discarding sabot projectile 3 essentially comprises a sub-calibre penetrator 4 with a conical fin assembly (not illustrated) and a discarding sabot 6 (guide sabot).

The propellant charge casing 2 comprises a casing cover 7, a relatively thin casing sheath 8 which is composed of combustible material, and a casing base 9 which is
5 composed, for example, of steel. The casing sheath 8 is attached in a manner known per se to a central projection 11 on the casing base 9 by means of a spring plate 10 and a locking ring (not illustrated). A propellant charge igniter 12, which is known per se and
10 extends axially into the interior of the propellant charge casing 2, is likewise connected to this projection 11.

According to the invention, the propellant charge
15 powder 13 which is located in the propellant charge casing 2 is arranged in a container 14 which is in the form of a sack, is composed of a cotton fabric and extends in the direction of the longitudinal axis 100 of the practice cartridge 1, and whose end area 15 at
20 the base end is likewise attached to the casing base 9 by means of the spring plate 10, in such a way that it also contains the propellant charge igniter 12.

The end area 16 at the projectile end of the container
25 14 which is in the form of a sack is in contrast attached to a composition disk 17 composed of plastic. Centrally, the latter has a hemispherical outward bulge 18 whose diameter corresponds to the diameter of the container 14 which is in the form of a sack, and has a
30 flat edge area 19 which surrounds this outward bulge 18.

At the end, the edge area 19 is connected in an interlocking manner to the propellant charge casing 2
35 in the junction area between the casing sheath 8 and the casing cover 7, and provides axial and radial centering for the container 14, which is in the form of

a sack, and the propellant charge powder 13 located in it.

As can be seen from Figure 2, at the rear end, the casing cover 7 has undercuts 20 which grip behind the edge area of the composition disk 17 when the casing cover 7 is pushed onto the casing sheath 8, fixing the composition disk 17 in the space 21 in front of the casing cover 7.

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Figure 3 shows the container 14, which is in the form of a sack, before its mounting within the propellant charge casing 2. On its end area 15 at the base end, the container 14 has an opening 22, by means of which the container 14 is pushed onto the projection 11 on the casing base 9, and is then attached by means of the spring plate 10.

The end area 16 at the projectile end of the container 14 which is in the form of a sack is axially separated, thus resulting in two separate areas 23, 24 which are in the form of tabs. These areas 23, 24 which are in the form of tabs are each passed through a recess 25, which is in the form of a slot, in the composition disk 17, which recesses 25 are arranged between the hemispherical outward bulge 18 and the flat edge area 19 and are each approximately sickle-shaped (Figure 4).

In order to attach the container 14, which is in the form of a sack, to the composition disk 17, the two areas 23, 24 which are in the form of tabs can be knotted to one another (indicated as the pointed area 26 in Figure 1). However, it is also possible for the areas 23, 24 which are in the form of tabs to be adhesively bonded to the composition disk 17 at the front end.

The space for the propellant charge powder 13, created in this way in the container 14 which is in the form of a sack, is essentially dependent on the diameter of the spring plate 10 which is used, the size of the recesses 5 25 which are in the form of slots in the composition disk 17, the fixed axial position of the composition disk 17 within the propellant charge casing 2, and the shape of the composition disk 17, and can therefore be varied within wide limits, depending on the amount of 10 propellant charge powder to be used.

Figure 5 shows the casing cover 7 (also casing cap) in the form of a perspective illustration. The casing cover 7 has sharp-edged weak points 7.1 as well as a 15 circumferential neck 7.2, on which the discarding sabot 6 acts.

The invention is, of course, not restricted to the exemplary embodiment described above. For example, the 20 composition disk may also have merely a shape in the form of a disk or else, for example, may have a parabolic outward bulge.

Furthermore, the composition disk can be mounted in the 25 area between the casing sheath and the casing cover by means of different interlocking and/or force-fitting connections with which a person skilled in the art will be familiar.

List of reference symbols

1	Cartridge, practice cartridge
2	Propellant charge casing
3	Discarding sabot projectile, projectile part
4	Penetrator
6	Discarding sabot (guide sabot)
7	Casing cover
7.1	Weak points
7.2	Circumferential neck
8	Casing sheath
9	Casing base
10	Spring plate
11	Projection
12	Propellant charge igniter
13	Propellant charge powder
14	Container in the form of a sack
15	End area at the base end
16	End area at the projectile end
17	Composition aid (disk)
18	(Hemispherical) outward bulge
19	Edge area
20	Undercuts
21	Space
22	Opening
23, 24	Areas in the form of tabs
25	Recess in the form of a slot
26	Pointed area
100	Longitudinal axis

The invention claimed is:

1. A cartridge having:

- (a) a propellant charge casing that is at least partially filled with propellant charge powder; and
- (b) a projectile part connected to the propellant charge casing at a front end of the propellant charge casing, wherein the propellant charge casing has
 - i. a casing cover;
 - ii. a casing sheath; and
 - iii. a casing base, wherein the casing sheath is connected on one end via the casing cover to the projectile part and the casing sheath is connected on another end via a spring plate to the casing base, andthe propellant charge powder is arranged in a container that is in the form of a sack and extends in a direction of a longitudinal axis of the cartridge.

2. The cartridge as claimed in claim 1, wherein a first end area located at a base end of the container is attached to the casing base by the spring plate, and a second end area located at a projectile end of the container is connected to a composition aid that is arranged transversely with respect to the longitudinal axis of the cartridge, and an edge area of the composition aid is flat, and is connected in a force-fitting manner, or in an interlocking manner, or in a force-fitting and interlocking manner, at a junction area to the casing sheath, or to the casing cover, or to the casing sheath and the casing cover.

3. The cartridge as claimed in claim 2, wherein the composition aid is in the form of a cap and has a hemispherical outward bulge that extends in a direction of the projectile part, and a flat edge area of the composition aid surrounds the outward bulge, wherein an internal diameter of the outward bulge corresponds to an internal diameter of the container.

4. The cartridge as claimed in claim 3, wherein the composition aid has at least two opposite recesses formed therein in the form of slots in the junction area between the outward bulge and the flat edge area, wherein through the recesses two front areas of the second end area of the container pass, wherein the two front areas are in the form of tabs and are axially separated from one another at the projectile end of the container, and the two front areas are connected in a force-fitting manner at a front end of the compositional aid to the outward bulge.
5. The cartridge as claimed in claim 4, wherein the two front areas of the container are knotted to one another.
6. The cartridge as claimed in claim 3, wherein the two front areas are adhesively bonded to the outward bulge on the composition aid.
7. The cartridge as claimed in claim 2, wherein the composition aid is made of a plastic, and the plastic is a sprayable plastic.
8. The cartridge as claimed in claim 2, wherein an end attachment of the composition aid is provided in the junction area between the casing sheath and the casing cover.
9. The cartridge as claimed in claim 1, wherein the container comprises cotton fabric.