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54 **Projectile for compressed air carbins of the rifled barrel type.**

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GB-A- 1 524 743 US-A- 910 935
US-A- 4 063 511

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Description

The invention relates to a projectile for compressed air carbines having their barrel provided with internal helical riflings, according to the precharacterizing part of claim 1. A projectile of this type is known from the document GB-A-1.524.743.

From the document GB-A-19297/A.D.1902 is known a projectile for use in air guns, comprising a cylindrical body with a conical forepart and with four equispaced longitudinal ribs having a part-circular shape in cross-section, and extending over a length of the cylindrical body. From the document FR-A-897.515 is known a projectile also comprising a cylindrical body, however with an ogival forepart and with a plurality of equispaced helical ribs having a rectangular outline in cross-section. The projectile known from the document US-A-910.935 also has a cylindrical body and an ogival forepart, but is formed, in lieu of the ribs, with a plurality of equispaced helical grooves having a rectangular profile, so that the teeth between the grooves have a radially outwardly flaring trapezoidal shape in cross-section. Finally, from the document US-A-4.063.511 is known a projectile for shot guns, having a conical forward end and a cylindrical body provided with a plurality of equispaced, slightly helical longitudinal grooves or recesses being part-circular in cross-section, so that teeth or vanes are formed therebetween, the said teeth or vanes having concave sides, and being substantially parallel to each other at the free ends thereof. In all of these known projectiles, the outward teeth on the projectile body extend over almost the whole length, or over an important section of the length of the projectile body.

The invention aims to improve the projectile according to the preamble of claim 1, which is like the projectile known from the document GB-A-1524743, in such a manner that the projectile is imparted a rotatory axial motion that determines a high firing velocity of the same and a considerable precision in the projectile forward motion, and to improve at the same time the aerodynamic properties and so the velocity of the projectile and the capability of the projectile of maintaining the direction thereof.

This problem is solved by the invention by the combination of features according to the characterizing part of claim 1.

Some further advantageous improvements of the projectile are characterized in the dependent claims.

Some embodiments of the projectile according to the invention will be now described by referring to the accompanying drawing, in which:

Figure 1 is a perspective view of the projectile

according to one preferred embodiment of the invention.

Figure 2 is a perspective view showing an alternative embodiment of the toothed ring of the projectile.

Figure 3 is a perspective view showing still another alternative embodiment of the projectile, in which a toothed ring is provided near the airtight collar or collars for preventing air from escaping, located at the projectile rear end.

The projectile according to the invention is made from only one piece of lead or a lead alloy, or from any other suitable material (see hereinafter), and is obtained by any suitable known art.

In Figure 1 reference A denotes the projectile front section, substantially comprising a conical portion 1 and a cylindrical portion 2, which are connected to each other by an enlarged downwardly flaring small portion 3 being interposed therebetween. The diameter of portion 2 is suitably greater than the base diameter of portion 3.

A portion 4 in form of an upturned truncated cone extends from the lower end side of portion 2.

Reference B denotes the rear section of the projectile, which comprises a truncated cone-shaped portion 5 and a cylindrical end collar 6.

The said portions 1, 2, 3, 4, 5, and 6 are set in a perfectly coaxial relation.

One of the differentiating features of the projectile according to the invention relative to the known projectiles, is the provision of at least one ring of equispaced teeth 7 at portion 2 of the projectile front section, and the said teeth 7 are characterized by such a typical profile that the same can be screwed into the internal helical riflings in a carbine barrel, whereby the projectile will be ejected from the carbine by being imparted a rotatory axial motion that improves the penetration of the projectile and the capability of the projectile of maintaining the laying direction thereof.

The dimensions and the spacing apart from each other of the teeth 7 depend on the characteristic dimensions and on the shape of the internal riflings in the carbine barrel, so that these parameters will be not disclosed in detail in the following.

The teeth 7 are parallel to the axis of the projectile, and preferably have a substantially trapezoidal profile, with their surface being suitably rounded. It is however understood that the profile of said teeth 7 may be widely modified.

According to a modified construction, the teeth 7 may be suitably inclined, as in the example shown in Figure 2. In this case, the inclination of said teeth is preferably limited to a not too high value.

According to another modified embodiment,

not shown, more than one toothed ring set in a spaced apart relation by respective annular recesses, may be provided at the projectile portion 2, and the teeth of one ring may be trued with the teeth of the adjoining toothed ring, or these teeth may be suitably offset, so that a function which is equivalent to the function of the inclined teeth shown in Figure 2, will be attained as a whole.

According to a further modified embodiment shown in Figure 3, the projectile may be provided in combination with, or as an alternative to the toothed ring or rings at the projectile front portion 2, with at least one ring of teeth 8 arranged close to, and directly upstream of the cylindrical rear end collar 6, this still for allowing the projectile to be screwed into the riflings of a carbine barrel. A collar like the collar 6 may be provided also upstream of the toothed ring 8.

Also in respect of the ring of teeth 8, the same considerations apply, as previously made in connection with Figure 2.

The surface of the truncated cone-shaped rear portion 5 of the projectile according to the invention, is provided with a plurality of helical grooves 105 which are preferably inclined by 45°, and are directed in the same sense as the barrel riflings, so that the aerodynamic properties and so the velocity of the projectile, and the capability of the projectile of maintaining the direction thereof will be improved.

It should be understood that the projectile may be covered with any suitable metallic or non-metallic material, and this in order to isolate the lead material of the projectile and prevent the hands of a user from touching it, and in order to decrease the projectile sliding friction on the carbine barrel, and to improve the successive penetration into air of the projectile, and to improve as well, if a particularly hard covering material has been used, the penetration of the projectile into the target.

Claims

1. A projectile for compressed air carbines having their barrel provided with internal helical riflings, comprising:
 - a) a conical forepart (1) with the apex thereof being directed forward,
 - b) an intermediate truncated cone-shaped portion (4) with the small end side thereof being turned backward,
 - c) a truncated cone-shaped rear portion (5) with the large end side thereof being turned backward, and with the small forward end side thereof having the same diameter as the small rear end side of the intermediate portion (4), and being connected thereto, characterized by the combination of the

following features:

d) a cylindrical portion (2) with a ring of equispaced equal teeth (7) is provided between the forepart (1) and the intermediate portion (4) and/or at the large backward end side of the rear portion (5),

e) the teeth (7) on the cylindrical portion (2) have a tapered shape with plane sidewalls,

f) the free ends (107) of the teeth (7) project radially to such an extent as to be screwed into the helical riflings of the carbine barrel,

g) the surface of the rear portion (5) is provided with equispaced equal helical grooves (105).

2. The projectile according to claim 1, characterized in that the helical grooves (105) in the rear portion (5) have the same screwing direction as the helical riflings in the carbine barrel.
3. The projectile according to claim 1 or 2, characterized in that the teeth (7) on the cylindrical portion (2) are parallel to the axis of the projectile.
4. The projectile according to claim 1 or 2, characterized in that the teeth (7) on the cylindrical portion (2) are inclined with respect to the axis of the projectile.
5. The projectile according to any of claims 1 to 4, characterized in that the teeth (7) on the cylindrical portion (2) have a substantially trapezoidal profile.
6. The projectile according to any of claims 1 to 5, characterized in that the conical forepart (1) is connected to the toothed cylindrical portion (2) through a rearwardly flaring, truncated cone-shaped small portion (3).
7. The projectile according to any of claims 1 to 6, characterized in that the projectile is made of lead or of a lead alloy, and is covered by a metallic or non-metallic material, particularly a hard material.

Patentansprüche

1. Ein Geschoß für Druckluftgewehre mit inneren Spiralzügen, bestehend aus:
 - a) einem konischen Vorderteil (1), dessen Scheitelpunkt vorwärts gerichtet ist;
 - b) einem abgestumpften, kegelförmigen Zwischenteil (4), dessen Seite mit dem kleinen Ende rückwärts gedreht ist;
 - c) einem abgestumpften, kegelförmigen, hinteren Teil (5), dessen Seite mit dem gro-

ßen Ende rückwärts gedreht ist, und dessen Seite mit dem kleinen vorderen Ende denselben Durchmesser hat wie die Seite mit dem kleinen hinteren Ende des Zwischenteils (4) und damit verbunden ist, durch die Kombination der folgenden Merkmale gekennzeichnet:

d) ein zylindrischer Teil (2) mit einem Ring aus äquidistanten, gleichen Zähnen (7) ist zwischen dem Vorderteil (1) und dem Zwischenteil (4) und/oder an der Seite mit dem großen rückwärtigen Ende des hinteren Teils (5) vorgesehen;

e) die Zähne (7) auf dem zylindrischen Teil (2) haben eine kegelige Form mit ebenen Seiterwänden;

f) die freien Ende (107) der Zähne (7) ragen radial soweit heraus, daß sie in die Spiralzüge des Gewehrlaufs hineingeschraubt werden;

g) die Oberfläche des hinteren Teils (5) ist mit äquidistanten, gleichen Spiralnuten (105) versehen;

2. Das Geschoß nach Anspruch 1, dadurch gekennzeichnet, daß die Spiralnuten (105) im hinteren Teil (5) dieselbe Schraubrichtung haben wie die Spiralzüge in dem Gewehrlauf. 25
3. Das Geschoß nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Zähne (7) auf dem zylindrischen Teil (2) parallel zur Achse des Geschosses liegen. 30
4. Das Geschoß nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Zähne (7) auf dem zylindrischen Teil (2) mit Bezug zur Achse des Geschosses schräggestellt sind. 35
5. Das Geschoß nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß die Zähne (7) auf dem zylindrischen Teil (2) ein im wesentlichen trapezförmiges Profil haben. 40
6. Das Geschoß nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß das konische Vorderteil (1) über einen sich nach hinten erweiternden, abgestumpften, kegelförmigen, kleinen Teil (3) mit dem gezahnten zylindrischen Teil (2) verbunden ist. 45
7. Das Geschoß nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, daß das Geschoß aus Blei oder aus einer Bleilegierung hergestellt und mit einem metallischen oder nicht-metallischen Material, insbesondere einem harten Material, überzogen ist. 55

Revendications

1. Projectile pour carabines à air comprimé dont le canon est muni de rayures hélicoïdales intérieures, comprenant 5
 - a) une partie antérieure conique (1) dont le sommet est dirigé vers l'avant,
 - b) une région intermédiaire tronconique (4) dont la face extrême étroite est orientée vers l'arrière, 10
 - c) une région postérieure tronconique (5) dont la face extrême large est orientée vers l'arrière, et dont la face extrême antérieure étroite présente le même diamètre que la face extrême postérieure étroite de la région intermédiaire (4), à laquelle elle est reliée, 15

caractérisé par la combinaison des caractéristiques suivantes :
 - d) une région cylindrique (2), munie d'une couronne de dents identiques équidistantes (7), est prévue entre la partie antérieure (1) et la région intermédiaire (4) et/ou à la face extrême postérieure large de la région postérieure (5), 20
 - e) les dents (7) ménagées sur la région cylindrique (2) présentent une forme décroissant de section, avec des parois latérales planes,
 - f) les extrémités libres (107) des dents (7) font saillie, dans le sens radial, d'une distance leur permettant d'être engagées dans les rayures hélicoïdales du canon de la carabine,
 - g) la surface de la région postérieure (5) est pourvue de rainures hélicoïdales identiques équidistantes (105). 25
2. Projectile selon la revendication 1, caractérisé par le fait que les rainures hélicoïdales (105), pratiquées dans la région postérieure (5), présentent la même direction d'engagement que les rayures hélicoïdales façonnées dans le canon de la carabine. 30
3. Projectile selon la revendication 1 ou 2, caractérisé par le fait que les dents (7), ménagées sur la région cylindrique (2), sont parallèles à l'axe du projectile. 35
4. Projectile selon la revendication 1 ou 2, caractérisé par le fait que les dents (7), ménagées sur la région cylindrique (2), sont inclinées par rapport l'axe du projectile. 40
5. Projectile selon l'une quelconque des revendications 1 à 4, caractérisé par le fait que les dents (7), ménagées sur la région cylindrique 45

(2), présentent un profil sensiblement trapézoïdal.

6. Projectile selon l'une quelconque des revendications 1 à 5, caractérisé par le fait que la partie antérieure conique (1) est reliée à la région cylindrique dentée (2) par l'intermédiaire d'une courte région tronconique (3) s'élevant vers l'arrière.
7. Projectile selon l'une quelconque des revendications 1 à 6, caractérisé par le fait que ce projectile est fabriqué en plomb ou en un alliage de plomb, et est recouvert d'un matériau métallique ou non métallique, en particulier d'un matériau dur.

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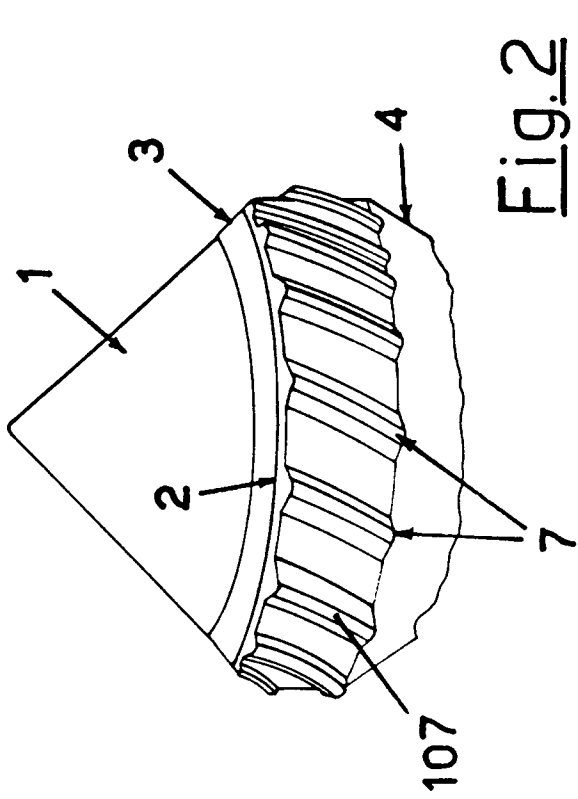


Fig. 2

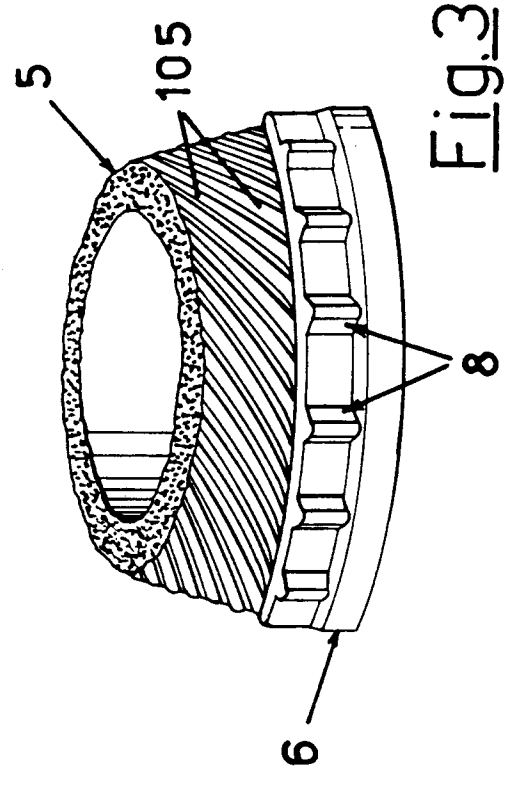


Fig. 3

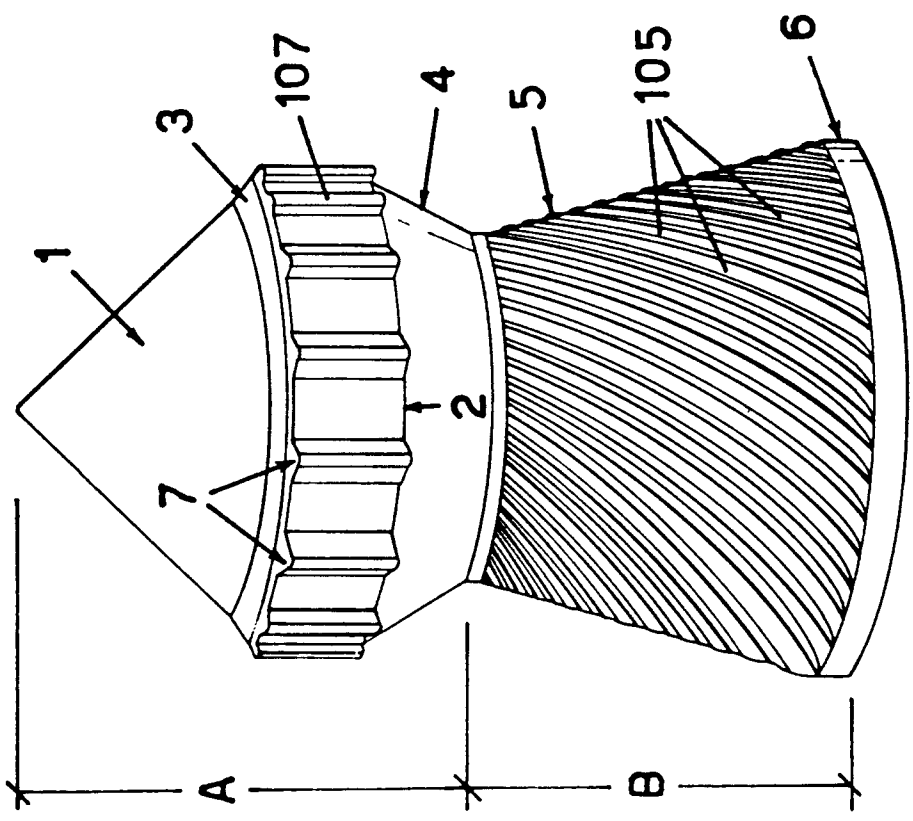


Fig. 1