

**Method for manufacturing banded projectiles intended for firing from rifled barrels and projectiles made according to the method, and method for utilizing their special characteristics imparted by the method for manufacture when firing these projectiles**

#### TECHNICAL FIELD

The present invention relates to a method for manufacturing banded projectiles, primarily having metal bands, especially ones made of copper, intended for firing from rifled barrels, such as guns, antitank guns and anti-aircraft guns, combat vehicles, etc.

The invention also relates to a banded projectile intended to embody the method according to the invention.

The artillery projectiles manufactured according to the invention can, as a direct consequence of the specific method for manufacture, be endowed with the special characteristic that the projectiles, if so required, can be made convertible so that they leave the rifled barrel from which they are fired with or without inherent spin. The invention thereby encompasses projectiles made according to said method, which are intended for launching from rifled barrels and which with one simple operation can be converted between two different modes or functional variants, which means that the projectiles according to the one variant leave said barrel without any spin, and in the second variant with the spin that is normal for the barrel in question and the propellant charge used. The method according to the invention can also be used for manufacturing barrel projectiles without this conversion function, which from the outset therefore are made so that they leave the barrel with or without spin.

## BACKGROUND OF THE INVENTION AND PRIOR ART

Full-calibre projectiles fired from guns fitted with rifled barrels are normally spin-stabilized. The term spin-stabilized is intended to signify that the projectile is stabilized on its trajectory towards the target by causing the projectile to spin about its own longitudinal axis. In many cases, however, there is a need to fire certain special projectiles without any spin and most preferably from the same barrel that is normally used for firing spin-stabilized, conventional projectiles. The projectiles that have to be fired without spin primarily consist of guided, fin-stabilized, full-calibre projectiles with a long range and sub-calibre, armour-piercing, likewise fin-stabilized solid-core projectiles. Since such projectiles that need to be fired without spin can often occur in one salvo with other projectiles that require spin stabilization, there is no practical solution to the problem other than to change barrels between the types of projectile.

Conventional spin-stabilized projectiles that are fired from rifled barrels acquire their spin through the interaction between a band made of soft metal, usually copper, and the lands of the barrel rifling. In order that the spin of the band imparted by the barrel rifling can be fully transmitted to said projectile, the band must be torsionally fixed and immovably joined to the projectile. The conventional method for manufacturing metal-banded artillery projectiles has therefore hitherto meant that the annular band is prefabricated with an inner opening diameter that allows it to be drawn over said projectile before then pressing it under high pressure into a similarly prefabricated groove in said projectile, thereby reducing the outside and inside diameter of the band. For manufacturing large-calibre artillery shells, large presses have therefore been required, which naturally increases the manufacturing cost.

## OBJECT AND SUMMARY OF THE INVENTION

An important object of the present invention is to provide an improved method for manufacturing banded  
5 projectiles which are intended to be fired from rifled barrels, which method at least substantially reduces and preferably eliminates said problems described, so that the beneficial properties of said banded projectiles can be used to better effect than hitherto.

10 The stated object and other aims not enumerated here are satisfactorily achieved within the scope of the specifications contained in the present independent patent claims. Embodiments of the invention are  
15 specified in the dependent patent claims.

The present invention has therefore accordingly provided an improved method for manufacturing banded projectiles intended to be fired from rifled barrels,  
20 which is characterized in that the basically annular bands of the projectiles are joined to the projectile body by way of an internal thread and a corresponding external thread applied along the outside of said body.

25 According to further aspects of the method according to the invention:

When the projectile firing is intended to be spin-stabilized, the band, after threading onto the  
30 projectile body but before firing, is fixed in relation to the projectile body in a rear stop position in the launch direction of the projectile.

When launching one and the same type of banded  
35 projectile from a rifled barrel, a choice is offered between an entirely spin-free launch of said projectile and a spinning launch of the projectile consistent with the barrel rifling, the bands of the projectiles being provided with an internal thread that is threaded onto

a corresponding external thread on the projectile body, and the band, for a spin-free launch, being fitted as far forward as possible in the launch direction of the projectile onto the external thread on the projectile body, this external thread, which is formed with the same handed thread as the barrel rifling and with at least the same number of thread turns as the barrel rifling, forcing the band to spin as it is projected through the barrel, and the scope for the band to spin being prevented prior to launching, when full spinning of the projectile is required.

When full spinning of the fired projectile is required, the scope for the band to spin is prevented in that the band, before firing of the projectile, is screwed rearwards in the intended launch direction of the projectile along the external thread on the projectile body to a stop position, which ensures that the spin which the barrel rifling imparts to the band is fully transmitted to the projectile body.

In spin-free firing of projectiles that are launched with the aid of banded discarding sabots, it is ensured that each discarding sabot is fully freed from its respective band when the discarding sabots leave the barrel, the discarding sabots being provided with external threads on which respective internally threaded bands are threaded to the foremost position of the respective external thread in the intended launch direction of the projectile, and these threads being formed with a number of thread turns somewhat fewer than the number of turns included in the barrel rifling.

Banded, full-calibre projectiles are manufactured, which are intended to be capable of firing from rifled barrels either entirely free of spin or with the spin generated by the rifling of the barrel used for launching, the projectile being manufactured in the

form of two projectile parts screwed together, of which the one projectile part has an externally threaded joining part, which is designed to be inserted into a matching cavity in the second projectile part correspondingly provided with an internal thread, and one or other of the projectile parts having a reduction-turned threaded section adjacent to the joint between them for screwing on the internally threaded band, onto which section the band is threaded before the projectile parts are screwed together.

Furthermore, according to the invention the banded projectile intended to embody the method according to the invention is characterized in that the band is joined to the projectile by means of its own internal thread and a corresponding external thread arranged along the outside of the projectile, said threads interacting with one another.

According to further aspects of the banded projectile intended to embody the method according to the invention:

The projectiles can be fired entirely without spin, or alternatively under the spin imparted by the barrel rifling, each projectile comprising an external thread onto which is threaded an intrinsically annular band, which inherently comprises a corresponding internal thread, and both of these threads having the same handed thread as the barrel rifling and the projectile external thread having a pitch and thread length that is chosen to allow the matching internally threaded band to be displaced from a forward position in the launch direction of the projectile to a rearward position in the launch direction of the projectile, this movement covering at least the same number of thread turns as the number of turns in the barrel rifling over the entire length of the barrel.

When the banded projectile is intended to be fired from a rifled barrel, which it must leave entirely free of spin, the projectile consists of a sub-calibre, armour-piercing, hard-core projectile fin-stabilized on its trajectory to the target, which is fired from said barrel with the aid of a discarding sabot, which in turn has an external thread, onto which the band having an internal thread engaging therein is threaded, the thread of the discarding sabot being of a length designed to ensure that the band leaves the discarding sabot as the projectile leaves the barrel.

The band of the projectile is provided with fracture lines which ensure that the band is broken up into multiple parts when it has been threaded by the discarding sabot and thereby leaves the latter.

#### ADVANTAGES AND EFFECTS OF THE INVENTION

According to the present invention the band, in its basic its design, instead of being pressed down into a groove in the artillery projectile, is joined to said projectile by threading it onto the projectile body. Since each banded artillery projectile must normally have the same diameter in front of the band as behind it, and since in the method according to the invention threading the band onto the projectile body does not simultaneously involve a reduction in the diameter of the band, the method according to the invention means that artillery projectiles with metal bands threaded on are normally manufactured in the form of at least two parts joined together. According to this variant of the invention, one of these two parts is formed with a reduction-turned and threaded end section, against the inner part of which the band is threaded on and the outer part of which is screwed into a similarly threaded recess in the other part of the projectile. In the case of banded projectiles manufactured in the manner outlined above, the band once threaded on will come to rest in a sunken groove, which towards one end

of the projectile is defined by the end edge of the reduction turning and towards the other end of the projectile is defined by the end edge of the other projectile part.

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A special case, which will be discussed in more detail below, are banded so-called discarding sabots on sub-calibre hard-core projectiles.

10 In its simplest form, therefore, the present invention comprises a method for fixing the internally threaded band on artillery projectiles by means of an external screw thread arranged on the latter, instead of pressing the band into a groove in the projectile. This  
15 new method holds several advantages.

In its basic form, therefore, the invention means that manufacturing becomes less expensive, since there is no longer any need for high-pressure pressing of the band.  
20 This is achieved despite the fact that the method according to the invention necessarily involves manufacturing the artillery shells in two parts that are joined together. These two shell parts can in fact be readily manufactured on the same automatic machines  
25 previously used for manufacturing shells in one piece. Moreover, according to further developments of the invention it is possible, according to the same basic principle, to manufacture artillery projectiles which can alternatively be launched from a rifled barrel with  
30 or without spin, whilst it is also possible, according to a new method, to launch spin-free projectiles from rifled barrels without the use of so-called slipping plastic bands which, as will be apparent from the following, has many disadvantages.

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If it is intended to launch a fin-stabilized projectile from a rifled barrel without the barrel rifling causing the projectile to spin, it is necessary in the prior art to use a projectile provided with a so-called

slipping band. Basically the slipping band, which on projectiles intended for spin-free firing replaces the copper band of the conventional spin-stabilized projectile, has approximately the same shape as the copper band, but the slipping band is made from polyacetal or other plastic material. However, the slipping band is not quite the ideal solution to the problem, even though its use has become very widespread. The slipping plastic band, for example, does not afford the same effective seal against the rifled inside of the barrel as a non-slipping copper band and it thereby tends to reduce the muzzle velocity  $V_0$  of the projectile, and it is furthermore not uncommon to get so-called "blow by" with slipping plastic bands, which means that sufficient quantities of propellant gases leak past the band to damage the forward part of the projectile, which can lead to serious problems in the case of so-called "intelligent ammunition". Other disadvantages of the so-called slipping band include the fact that because it has to be made from a relatively soft material, up to the point of firing it is always very susceptible to external damage. In addition it is very tricky to design slipping plastic bands with the right slipping characteristics. The testing of new types of projectiles with slipping bands therefore always proves very costly. Finally the slipping bands are difficult to fit in that they easily acquire permanent deformations when fitting, in as much as the fitting normally involves pressing the closed band ring over a guide bead on the full-calibre shell or on the discarding sabot in the case of the sub-calibre, solid core projectile.

The present invention now provides a solution to the aforementioned problems, which means that in future it will also be possible to use metal bands, for example copper bands, when firing non-spinning projectiles from rifled barrels. The invention also means that, even at a late stage right up to a point just prior to firing

and without any actual conversion, it will be possible to adapt one and the same projectile from one which in a first variant or mode leaves a rifled barrel as a non-spinning projectile, which, provided that it contains the necessary control functions from the outset could, after shedding the stabilizer fins, also be guided towards the intended target, to one which in its other variant, when fired from the same barrel, functions as an entirely conventional, spinning projectile, without the constituent fins of the profile being allowed to fall off. The latter variant is therefore suitable over short ranges, for example, which do not allow for shedding of the fins and in which it is not possible to make use of control functions. The present invention therefore makes it possible to use one and the same shell type for two different types of target, each of which previously required a different type of shell.

Non-spinning, fin-stabilized artillery projectiles form part of the prior art and there are therefore multiple different ways of designing the fins and fin shedding mechanisms used in such projectiles, and the arrangements for determining when and whether the fins are to be shed. Since these elements do not constitute parts of the actual invention, they will not be discussed in any more detail here.

According to the present invention a solution is now provided to the problem of producing a metal banded artillery projectile which can be fired from a rifled barrel either entirely spin-free or with full spin in that the basically annular copper bands of the projectiles have been threaded and torsionally fixed by means of an internal thread onto an external thread on the projectile body. The basic idea behind the invention is therefore that if a projectile of the type characteristic of the invention is fired from a rifled barrel and if the projectile is required to leave the

barrel without spinning, the band, when the rifling forces it to spin, must not transmit its own rotation to the projectile, but must instead utilize this in order to move rearwards in the launch direction of the projectile along the projectile thread. For this to work there must therefore, viewed in the launch direction of the projectile, be a sufficient number of thread turns available behind the band threaded onto the projectile, and the threads of the projectile and the band must have the same handed thread as the barrel rifling. In firing, the slipping rotation of the slipping band relative to the projectile body is therefore replaced by the rotation and movement of the threaded copper band rearwards along the thread on the projectile body. If the scope for movement of the band along the projectile thread is instead prevented prior to firing, the rotation of the band will still be transmitted to the projectile, which will then therefore leave the barrel from which it is fired as an entirely conventional spin-stabilized projectile. The simplest way of locking the band threaded on is naturally to screw it down to a stop which limits the projectile thread rearwards in the launch direction of the projectile.

25 A projectile or shell of the type characteristic of the invention is therefore distinguished by the provision along its circumferential surface of an external thread onto which an internally threaded copper band is screwed. In order to make the projectile convertible between a spin-free and a spinning firing mode, the length of the projectile thread behind the band with the band screwed on in a forward position must contain at least the same number of turns as the number of rifling turns in the barrel intended for firing the projectile in question. With the band in this forward position in the launch direction, the projectile in question will leave the barrel without spinning. If, before launching, the band is instead screwed rearwards

in the launch direction to a fixed rear stop position, the projectile will leave the barrel as a spin-stabilized projectile with a full spin consistent with the barrel used.

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The barrel for the Bofors 57 mm automatic cannon, which needs to be capable of firing both spin-stabilized explosive shells and fin-stabilized, non-spinning armour-piercing solid core projectiles, has a rifling  
10 twist which gives a turn of 24x57 mm. In everyday terms we say that the barrel has 24 calibre rifling twist. This means that a spin-stabilized shell performs a revolution of 1368 mm:s barrel length. Since the length of the barrel is 57x70, i.e. 3990 mm, the shell turns  
15  $3880/1368 = 2.9$  revolutions during its travel through the barrel. When a spin-stabilized projectile is launched from such a barrel, it acquires a spin of approximately 45,000 revolutions per minute, if the muzzle velocity is 1025 m/s.

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Since the barrel rifling is never equal to more than a few turns, the play that can occur in front of or behind a band fitted according to the invention, depending on whether a spinning or non-spinning launch  
25 is required, will never interfere to any great degree with the ballistics of the projectiles.

Whilst the full projectile according to the invention may equally well retain the band after it leaves the  
30 barrel, regardless of whether it is launched spinning or spin-free and therefore also irrespective of whether the band is in its forward or rear position when the projectile leaves the barrel, the opposite is the case when it comes to sub-calibre armour-piercing solid-core  
35 projectiles, which are launched with the aid of so-called discarding sabots, which must leave the actual projectile as soon as it leaves the muzzle of the barrel. It is then therefore an advantage if the thread on the discarding sabot is designed so that the band is

unthreaded from the discarding sabot at the right time, and in order to prevent the unthreaded band from damaging the fins of the solid-core projectile the band in this variant may be supplemented by fracture lines which ensure that it splits up into smaller parts as soon it has left the discarding sabot. By replacing the slipping bands previously used on the discarding sabots of sub-calibre, antitank solid cores with threaded copper bands designed according to the invention, which are unthreaded during the progress of the projectile through the barrel, it is also advantageously possible to replace the fracture strips or corresponding structures that were formerly used in order to hold together the discarding sabots composed of multiple different parts. While ever the bands are situated along the threading of the discarding sabot, they will effectively hold the parts of the discarding sabot together, before then releasing these as soon as it has left the threading.

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#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention has been defined in the following patent claims and will now be described in somewhat more detail in conjunction with the drawings attached, in which:

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Fig. 1 shows a side view of a first embodiment of a projectile according to the invention in the form of an artillery shell adapted for firing without any spin being transmitted to the shell,

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Fig. 2 shows a side view of the artillery shell according to Fig. 1 adapted for firing with full spinning of the shell after the shell has left the barrel,

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Fig. 3 shows a partially sectional side view of a second embodiment of a projectile according to

the invention in the form of a sub-calibre, solid-core projectile, here of the antitank, solid-core type, which is fired without any spin being transmitted to the actual antitank solid core.

Fig. 4 is a front view of the metal band for the antitank solid core in Fig. 3, and

Fig. 5 is a partially sectional side view of a shell which is manufactured according to the invention and is adapted for firing without any spin being transmitted to the shell.

Fig. 6 is a partially sectional side view of a shell manufactured according to the invention, in its simplest non-convertible embodiment with spinning flight of the shell.

#### DETAILED DESCRIPTION OF EMBODIMENTS

The projectile 1 shown in Figs. 1 and 2, here in the particular form of an artillery shell 1, is designed according to basic principles of the invention and is thereby provided with a section 2, which is reduction-turned somewhat from the actual circumferential surface and is provided with an external thread 3. An internally threaded metal band 4 with the same type of thread, preferably made of copper, is in turn screwed on to the thread 3. The thread 3 is of the same handed thread as the direction of the rifling in the barrel through which the shell 1 is intended to be fired, and its thread pitch is selected so that the thread 3 inside the accessible reduction-turned section 2 allows it to be turned around the fitted internally threaded copper band 4 having the same type of thread by at least the same number of turns generated by the rifling of the barrel in question.

Fig. 1 shows the variant of the invention in which the

copper band 4 is in its forward position in the launch direction a of the shell 1, so that the band 4, when the barrel rifling causes it to spin as it is projected through the rifled barrel, will move rearwards along the thread 3 in the launch direction a of the shell 1, without thereby transmitting any spin to the shell 1. The shell 1 will therefore leave the barrel entirely free of spin.

Fig. 2 shows the same shell 1 as in Fig. 1 but here the copper band 4 has already before firing been screwed back to a specific stop position consisting, for example, of a stop edge 5, which towards the rear in the intended launch direction a of the shell 1 defines the reduction-turned section 2. In this variant, therefore, the rearward movement of the band 4, viewed in the launch direction a of the shell 1, is effectively blocked, so that the spinning of the band 4 generated by the barrel rifling will be fully transmitted to the shell 1, which will therefore leave the barrel fully spinning.

Fig. 3 shows a barrel projectile in the form of a sub-calibre, solid core projectile 6, for example an armour-piercing antitank solid core, which is fin-stabilized on its trajectory to the target and is provided with a multipart discarding sabot 7, which discarding sabot 7 has a rear threaded section 8, onto which section 8 an internally threaded metal band 9, of corresponding thread type and made of copper, for example, has been screwed. The threading 8-8a is designed so that the spinning of the band 9 generated by the barrel rifling during the launch is transmitted to the thread of the band 9 as the projectile 6 in question leaves the barrel from which the projectile 6 is fired. At the same time that the band 9 leaves the discarding sabot 7, the cohesive function which it exerts on the various parts of the discarding sabot 7 also ceases. In order that the band 9, when it detaches

from the discarding sabot 7, will not damage the fins 6' of the solid-core projectile 6, the band 9 has been provided with the fracture lines 10 illustrated in Fig. 4, which ensure that the band 9 splits up in multiple smaller pieces.

Fig. 5 has primarily been included in order to illustrate a suitable method for manufacturing shells 1 of the artillery projectile type characteristic of the invention. According to this method the shells 1 are manufactured in two parts, 11 and 12, which are screwed together by means of an internal thread and an external thread, 13 and 14 respectively. This makes it easy to manufacture the external thread 15 characteristic of the invention and to screw it onto the band 16 threaded with the internal thread 15a before the shell parts 11 and 12 respectively are screwed together. Fig. 5 also shows an explosive-filled internal chamber 17 and a packing 18 common to the shell parts 11 and 12. Fig. 5 also again shows the same stop edge 5 for rearward displacement of the band 16 in the launch direction a of the shell 1 as in Fig. 2, and since the stop edge 5 also has the same function here, that is to say of threading the band 16 down until it bears against a rear stop position 5, here in the form of said stop edge 5, it has retained the reference numeral 5.

Fig. 6 shows a further embodiment of an artillery projectile of the shell 19 type manufactured according to the invention. This shell 19 is also manufactured from two shell parts 21 and 22 joined together, but the shell 19 is here of a simpler, non-convertible type. The shell 19 is also provided with a metal band 20, preferably of copper, fixed by threading on. Since the shell 19 is only intended for spinning firing, its copper band 20 is not only threaded onto the rear shell part 22 but is also immovably fixed between the shell parts 21 and 22. As will further be seen from Fig. 6, the shell part 21 is formed with an internally threaded

bore 24, the thread of which carries the reference 24a, whilst the shell part 22 has a joint part 25 externally threaded with the thread 25a and matched to the bore 24. The band 20 is in turn formed with an internal  
5 thread 20a. All of these threads are matched to one another and the band 20 has first been screwed onto the joint part 25 before the shell parts 21 and 22 have been screwed together. Joined together, the shell parts 21 and 22 have a common explosive-filled chamber 23.  
10 The reference numeral 26 indicates a packing or sealing compound.

#### ALTERNATIVE EMBODIMENTS

The invention is not only limited to the embodiments  
15 shown but may be varied in different ways without departing from the scope of the patent claims.

It will be appreciated, for example, that the terms artillery, gun, cannon, artillery projectile, artillery  
20 shell, projectile, hard-core projectile etc. above also relate to all types of barrelled weapons with associated projectiles which involve some form of rifling, for example antitank and combat vehicle cannon, grenade launchers, conventional artillery,  
25 troop support weapons, etc.

## PATENT CLAIMS

1. Method for manufacturing projectiles (1, 6, 11+12, 19) provided with bands (4, 9, 16, 20) and intended for firing from rifled barrels, **characterized in that** the basically annular bands (4, 9, 16, 20) of the projectiles (1, 6, 11+12, 19) are joined to the projectile body by way of an internal thread (8a, 15a, 20a) and a corresponding external thread (3, 8, 15, 25a) applied along the outside of said body.
2. Method according to Claim 1, **characterized in that** when the projectile (1, 6, 11+12, 19) is intended to be fired spin-stabilized, the band (4, 16, 20), after threading onto the projectile body but before firing, is fixed in relation to the projectile body in a rear stop position (5) in the launch direction (a) of the projectile.
3. Method according to Claim 1 or 2, **characterized in that** when launching one and the same type of banded (4, 16) projectile (1, 11+12) from a rifled barrel, a choice is offered between an entirely spin-free launch of said projectile (1, 11+12) and a spinning launch of the projectile consistent with the barrel rifling, the bands (4, 16) of the projectiles (1, 11+12) being provided with an internal thread (15a) that is threaded onto a corresponding external thread (3, 15) on the projectile body (1, 11+12), the band (4, 16), for a spin-free launch, being fitted as far forward as possible in the launch direction (a) of the projectile onto the external thread (3, 15) on the projectile body (1, 11+12), this external thread (3, 15), which is formed with the same handed thread as the barrel rifling and with at least the same number of thread turns as the barrel rifling, forcing the band (4, 16) to spin as it is projected through the barrel, and the scope for the band (4, 16) to spin being prevented (5) prior to launching, when a fully spinning launch of the

projectile (1, 11+12) is required.

4. Method according to Claim 1, 2 or 3, **characterized in that** when a fully spinning launch of the fired  
5 projectile (1, 11+12, 19) is required, the scope for the band (4+16) to spin is prevented in that the band (4, 16), before firing of the projectile (1, 11+12), is screwed rearwards in the intended launch direction (a) of the projectile (1, 11+12) along the external thread  
10 (3, 15) on the projectile body (1, 11+12) to a stop position (5), which ensures that the spin which the barrel rifling imparts to the band (4, 16) is fully transmitted to the projectile body (1, 11+12).

15 5. Method according to Claim 1 in spin-free firing of projectiles (6) that are launched with the aid of banded (9) discarding sabots (7) for ensuring that each discarding sabot (7) is fully freed from its respective band (9) when the discarding sabots (7) leave the  
20 barrel, **characterized in that** the discarding sabots (7) are provided with external threads (8) on which respective bands (9) provided with internal threads (8a) are screwed to the foremost position of the respective external thread (8) in the intended launch  
25 direction (a) of the projectile (6), these threads (8, 8a) being formed with a number of thread turns somewhat fewer than the number of turns included in the barrel rifling.

30 6. Method according to any one of Claims 1 to 4, for manufacturing banded, full-calibre projectiles (1, 11+12) intended to be capable of firing from rifled barrels either entirely free of spin or with the spin generated by the rifling of the barrel used for  
35 launching, **characterized in that** the projectile is manufactured in the form of two projectile parts (11 and 12, 21 and 22) that can be screwed together, of which the one projectile part (12 or 22) has an joining part which is provided with and external thread (14 or

24) and which is designed to be inserted into a matching cavity in the second projectile part (11 or 21) provided with a corresponding internal thread (13 or 24a), one or other of the projectile parts having a reduction-turned threaded section (15 or 24a) adjacent to the joint between them for screwing on the internally threaded band (16 or 20), onto which section the band (16 or 20) is threaded before the projectile parts (11 and 12, 21 and 22) are screwed together.

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7. Banded projectile intended to embody the method according to any one of Claims 1 to 6, **characterized in that** the band (4, 9, 20) is joined to the projectile by means of its own internal thread (15a, 21a) and a corresponding external thread (15, 21) arranged along the outside of the projectile, said threads (15a, 21a, 15, 21) interacting with one another.

8. Banded projectiles (1, 11+12) intended to embody the method according to any one of Claims 1 to 4, which projectiles (1, 11+12) can be fired entirely without spin, or alternatively under the spin imparted by the barrel rifling, **characterized in that** each projectile (1, 11+12) comprises an external thread (3, 8, 15) onto which is screwed an intrinsically annular band (4, 16), which inherently comprises a corresponding internal thread (15a), both of these threads (3, 8, 15, 15a) having the same handed thread as the barrel rifling and the external thread (3, 8, 15) of the projectile having a thread pitch and thread length that is chosen to allow the matching band (4, 16) provided with an internal thread (8a, 15a) to be displaced from a forward position in the launch direction (a) of the projectile to a rearward position in the launch direction (a) of the projectile, and that this movement covers at least the same number of thread turns as the number of turns in the barrel rifling over the entire length of the barrel.

9. Banded projectile (6-9) intended to embody the method according to any one of Claims 1, 3 or 5, and intended to be fired from a rifled barrel, which it must leave entirely free of spin, **characterized in that**  
5 the projectile consists of a sub-calibre, armour-piercing, hard-core projectile (6) fin-stabilized on its trajectory to the target, which is fired from the barrel in question with the aid of a discarding sabot (7), which in turn has an external thread (8), onto  
10 which the band (9) having an internal thread (8a) engaging therein is screwed, the thread (8) of the discarding sabot (7) being of a length designed to ensure that the band (9) leaves the discarding sabot as the projectile leaves the barrel.

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10. Banded projectile (6-9) intended to embody the method according to Claim 5 or 9, **characterized in that** its band (9) is provided with fracture lines (10) which ensure that the band (9) is broken up into multiple  
20 parts when it has been threaded by the discarding sabot (7) and thereby leaves the latter.