

Encoding Safety System for Firearms

Field of the Invention

The present invention relates to an encoding safety system for firearms, in particular self-loading firearms of the same type but different calibers, to prevent confusing weapon components. The invention also relates to a component for a weapon that has at least one safety element of such an encoding safety system and a self-loading firearm that has at least one safety element for use in a safety and identification system.

Positional terms in this document, such as, “up”, “down,” “front,” “back,” etc. refer to a firearm with a horizontal bore, with which rounds are fired toward the front, away from the shooter.

Background of the Invention

With firearms of the same type but different calibers, in particular self-loading firearms, one or more of the components may be unintentionally confused if they look identical when cleaning the firearms and subsequently reassembling them. Calibers of different sizes for nearly identical firearm platforms may have fatal consequences, e.g. explosions etc., endangering the health and life of the shooter and any bystanders.

The calibers of assault rifles in Europe are often designed for NATO 5.56 mm x 45 cartridges. In the USA the .300 caliber Blackout (7.62 mm x 35) has gained in popularity in recent years. The shell design for these .300 caliber Blackout cartridges is identical at the back to the NATO standard 5.56 x 45 cartridges. The .300 blackout cartridges are more powerful than the NATO cartridges within acceptable internal ballistics levels and was developed based on the 5.56 mm NATO cartridge.

Cartridges for .300 Blackout and .300 Whisper are a special caliber for ballistic niche applications, in particular for special forces in the police and military in conjunction with noise and flash signature suppressors. The special caliber is used in close-range combat for guarded

and unguarded primary targets, where noise suppression is important, specifically urban areas at close quarters, and for eliminating secondary targets relevant to the mission.

The 5.56 mm and .300 Blackout/Whisper basically have the same shells (5.56 mm NATO), but the shoulders and necks are substantially different due to the projectile diameters. Their external dimensions are nevertheless nearly identical. This is problematic, as shall be explained below.

Because the platforms for these self-loading firearms are identical, and the only differences are in the barrels and the chambers, and therefore (could) use the same magazine, it is difficult to distinguish these different caliber self-loading firearms from their external appearances. Because the external appearances of the 5.56 mm caliber NATO and the .300 caliber Blackout/Whisper are similar, it is possible to exchange their components, e.g. with the assault rifles HK433 and HK437.

Inserting a smaller 5.56 mm NATO cartridge in a larger .300 Blackout chamber is less critical, because the smaller 5.56 mm caliber shot in a barrel with 7.62 internal diameter would probably only result in a malfunctioning as it passes through the barrel due to too little power.

The risk potential posed by the 5.56 NATO shell not bearing on and being supported by the front part of the .300 Blackout chamber remains unclear. The back part of the shell is still supported and can rise, allowing for the pressure of the propulsion gas to dissipate in the barrel. Consequently, dangerous gas pressures may be formed in the chamber.

If there is too much pressure in the chamber, the bottom of the shell becomes deformed and the gas tends to escape at the breechblock impact base where there is no form-fitting support, e.g. the spring-loaded ejector or the extractor, resulting in leakage in the shell. These leakages can result in the gas pressure in the chamber exiting backward at pressures often exceeding 6,000 bar. This could cause an explosion, or injure the shooter.

With the .300 Blackout shells, there is substantially more risk. When a .300 Blackout cartridge is placed in a chamber for a smaller caliber, the larger bullet may become jammed at the entry to

the barrel. In this case, the opening of the shell and the throat thereof may be pushed over the stationary bullet by the closing breechblock. As a result, the back of the bullet compresses the free propellant in the shell, causing a compression resulting in high gas pressures that substantially expose the shooter and bystanders to the danger of an explosion.

Prior Art

DE 10 2009 057 864 A1 discloses a changing system for pistols. This comprises two different grips for different calibers, two different barrels for projectiles of different calibers, and/or two different magazines for cartridges of different calibers. The grip for the smaller caliber has a safety element that prevents the attachment of a barrel and/or magazine for a larger caliber.

The changing system allows a large-caliber weapon to be converted to a smaller caliber by exchanging the grip, and nevertheless prevents loading the small-caliber weapon with the larger caliber bullets.

There are also a variety of methods for converting military weapons to their civilian versions. Conventionally, the fully automatic function is disabled in the civilian versions of military weapons, but the caliber remains the same. Consequently, the problems described above do not occur. Frequently, the possibility of continuous firing is prevented by elements such as rails, etc. or specific shapes in or on the grip of such a civilian version. Examples of civilian versions include the SP5 for the MP5, the MR95 for the G95, and the HK393/C36 for the G36 by the applicant.

Object of the Invention and its Solution

Based on the prior art, the object of the present invention is to create a different, particularly improved, encoding safety system for firearms, in particular self-loading firearms of the type described above, that increases the safety thereof.

This problem is solved by an encoding safety system that has the features given in claim 1.

The object is also achieved by a weapon component that has at least one safety element for use in an encoding safety system according to any of the claims 1 to 7.

In addition, the invention results in a firearm, in particular a self-loading firearm, of a first or second caliber that has at least one safety element for use in an encoding safety system according to any of the claims 1 to 7.

The encoding safety system for firearms, in particular self-loading firearms, obtained with the invention, comprises:

- at least one first self-loading firearm with a first caliber or at least one component thereof,
- at least one second firearm with a second, different, caliber, or at least one component thereof (wherein the first caliber differs in size from the second),
- at least one first safety element on the first and/or second firearm, or the at least one component thereof, designed to prevent the attachment of at least one component from the at least one first firearm to the at least one second firearm, and
- at least one second safety element on the first and/or second firearm, or the at least one component thereof, designed to prevent the attachment of at least one component from the at least one second firearm to the at least one first firearm.

Firearms, as set forth in the invention, are any firearm such as a repeating rifle, hunting rifle, as well as self-loading firearms such as pistols, machine pistols, in particular assault weapons and machine guns, or any other self-loading firearm with which the safety thereof can be increased by an encoding safety system.

The invention results in an encoding safety system that prevents unintentional placement of a firearm component, in particular for a self-loading firearm, of the first caliber on a firearm, in particular a self-loading firearm, of the second, different, caliber, regardless of whether it is larger or smaller. The invention therefore prevents confusing components for firearms of different calibers. It also ensures the identification of components that are not intended for a specific caliber. Any number of the components of a firearm may have such a safety element.

These components may belong to both the first and second self-loading firearm. A component can also have more than one safety element, e.g. on a coupling interface or on two or more different coupling interfaces.

When numerous weapon components are encoded, in particular most or all components, and therefore have a safety element, safety can be improved to an optimal level.

The at least one first and second safety element can be designed for a mechanical query between at least two components. This eliminates the risk of confusing components or modules of the same type for different calibers.

The invention therefore prevents a potential, unintentional placement of a component for the first caliber firearm on the second caliber firearm, e.g. in a stressful situation. This is the case for a component for the first caliber firearm on a component for the second caliber firearm and vice versa. The encryption system can be used with the assault rifle HK433 chambered for 5.56x45mm NATO and the assault rifle HK437 chambered in .300 blackout.

With the encoding safety system, the at least one component for the first and/or second firearm can be at least one of the following components: the magazine, loader, grip/lower receiver, upper receiver, barrel receiver, barrel, locking element, breechblock, and/or bolt head.

The invention poses a mechanical query regarding the first and second safety elements between the aforementioned components, in particular between the barrel module and barrel nut, barrel nut and grip, grip and upper receiver, and grip and magazine.

The safety query concept obtained with the invention thus eliminates confusion of components for firearms of different calibers but of the same type, and thus increases the safety level. In other words, the safety element obtained with the invention prevents at least one component for a firearm with the first caliber from being replaced by a functionally identical component for a second firearm with a second caliber but of the same type, or placing the same component for the first firearm in the second firearm.

The at least one first and/or second safety element in the encoding safety system can be at least one mechanical structure or recess on a component, which allows components of the same caliber to be assembled, and prevents assembly of components of different calibers.

The at least one structure, as set forth in the invention, can be any suitable mechanical design, e.g. changes in the outer shape, diameter, size, dimensions of entire sections or subsections, and/or parts of the component.

The at least one recess or complementary structure, as set forth in the invention, can be any suitable corresponding counter-structure or counter-design, e.g. changes in the outer shape, diameter, size, dimensions of entire sections or subsections, and/or parts of the corresponding component, e.g. recesses, cavities, cut-outs, etc.

The at least one first and/or second safety element or structure in the encoding safety system can be an element on the at least one component that enables an engagement and/or form-fitting connection with a corresponding element, in particular the recess or counter-structure on a second component of the firearm of the same caliber, but prevents placement of a component for the first firearm on a component of the second firearm, and vice versa.

The first engaging element on the component can be a raised element such as a web, lobe, pin or projection, and the second engaging element can be a corresponding cavity, recess, hole, or groove.

The first or second engaging element can be placed and formed on any arbitrary, suitable section or part of the component.

By way of example, the barrel for the first caliber can have a safety element in the form of one of the second type of engaging elements that extends over at least part of the circumference thereof. This is designed for a form-fitting connection with the first engaging element on the grip. This

corresponding second element is not formed on the second barrel, thus making it impossible to place the barrel for the second caliber on the grip.

The first or second safety element can also be a recess inside the component for the first firearm, in particular in the magazine slot, that interacts with a corresponding structure on a magazine for the first firearm. This recess is not formed in the same component for the second firearm, specifically the magazine receiver, such that it is impossible to place the first component for the second firearm in the second component on the first firearm, specifically a magazine in the magazine receiver.

The at least one first and/or second safety element in the encoding safety system can be an enlargement or reduction of at least one section or part of the at least one component.

In a structurally simple approach, the diameter, length, size, or dimensions of a part or section of the component or components can be varied. In addition, one or more positioning pins on the first self-loading firearm can be larger or smaller, longer or shorter, stepped or slanted differently than the positioning pins on the second firearm.

With some assault rifles, e.g. HK433 and HK437, the lower receiver is folded onto the upper receiver via a hinge at the front, and secured thereto by a pin at the back. Positioning pins on both sides of the barrel receiver can be placed in corresponding recesses in the lower receiver. With positioning pins of different sizes on the different barrel receivers, and/or recesses of different sizes on the lower receivers for the first and second firearms, it can be ensured that the two components are never confused and placed on the wrong firearm. These positioning pins and/or recesses thus function as a potential safety element.

The safety element can be formed on all or just some interfaces on the individual components.

The at least one first and/or second safety element or structure in the encoding safety system can be formed by a visible and/or tactile marker, and/or there can also be at least one visible and/or tactile marker in addition to the at least one first and/or second safety element.

The at least one first and/or second safety element or structure in the encoding safety system can be on some or all of the components of the first and second firearm. A universal encoding on some or all of the components advantageously increases the safety level.

The grip can have a safety element in the form of a first recess at the front of the magazine receiver that interacts with a projection on the front of the magazine. This recess would then be missing on the grip for the second caliber. The recess and projection can also be formed elsewhere on the magazine and its receiver to function as safety elements.

In one embodiment, the grip can have a stop surface on the inside that interacts with a projection on the front of the magazine. The stop surface and projection can also be formed elsewhere on the grip and magazine to function as safety elements.

The magazine can have a safety element in the form of a projection on the front that interacts with a corresponding recess in the magazine receiver in the grip for the first caliber. In a simple design, there is no projection on the magazine for the second caliber, making it impossible to insert the magazine for the first caliber into the receiver in the grip for the second caliber.

The projection on the magazine can be a lug or web. This lug or web corresponds to a recess in the magazine receiver and can then only be inserted into this grip.

The projection can be formed on an upper part of the magazine, in particular at the front end. The width of the projection is equal to or less than the width of the magazine.

This projection, or web, on the magazine, can function as a stop, limiting how far the magazine can be inserted into the receiver, in particular on the front or back of the magazine.

With this design, the magazine receiver, or grip, has a stop surface on the inside that corresponds to the stop on the front or back of the magazine. It is easy to modify the lower or upper end of the magazine receiver in this way.

In particular, the invention prevents inserting a magazine for a first caliber into a receiver in a grip for a second caliber, and vice versa. This makes it easy to quickly replace magazines while effectively preventing unintentional insertion of the wrong magazine.

A recess can thus be formed in the magazine receiver and not on the magazine, and the projection can be formed on the magazine, instead of the in its receiver. A projection on the magazine helps in preventing confusion of the magazines for assault rifles. The projection can be formed on the upper front part of the magazine. It can then be seen and felt by the user, thus forming a first safety measure.

It is difficult to see or feel a recess in the magazine. It is important for the user to be able to tell whether the new magazine is the right one, however, particularly in stressful and difficult situations, e.g. during combat.

This effectively eliminates the possibility of placing the first magazine in the second firearm. The projection, or web, prevents the magazine from being fully inserted into the receiver in the grip, such that no cartridge can be loaded.

This is the same for a stop in the magazine receiver, which prevents insertion of a magazine without a corresponding recess.

The engaging elements can extend circumferentially. It has been shown that these elements do not have to extend over the entire length of the barrel, and that there needs to be a second corresponding element on the grip. As the drawings show, there are numerous possible designs for safety elements.

The barrel receivers and/or barrels for the first and/or second firearms can have at least one safety element in the form of a projection, e.g. a web or pin. This web or pin can correspond to a recess in the barrel receiver for the same firearm, such that the barrel can only be placed in the right barrel receiver. Depending on the size of the projection or web, and the corresponding

recess, the barrel from the first firearm cannot be placed in the barrel receiver for the second firearm, or vice versa. Depending on the size, the projection can be designed such that it keeps the barrel receiver on the firearm with a different caliber far enough away from the barrel that the barrel nut cannot be tightened thereon.

The barrel and/or locking element on the first and/or second firearm can have at least one projection, e.g. a web or pin, or at least one section with a different diameter. In the latter case, the barrel and/or locking element may be stepped, such that the section with the different diameter corresponds to a section of the locking element for the same firearm.

The threaded parts of the barrel and/or locking element can have different designs, e.g. with regard to the extension thereof and/or the thread pitch.

A barrel can only be placed in the corresponding locking element for the same firearm with these safety elements. Depending on the size of the projection, or the step, and the corresponding section, or the design of the threaded section, it is impossible to place the barrel for the first firearm in the locking element for the firearm with a different caliber. The projection can be designed such that it makes it impossible to attach the barrel to a firearm of a different caliber.

There can also be a tactile and/or visible marker on a component for the first or second firearm, in particular a magazine. This makes it easy to see and feel the different components at night or in adverse conditions.

The first engaging element can be coaxial to the barrel of a handgun, preferably at the front end of the grip, or lower receiver, of the weapon. This first element is preferably near the barrel receiver in the grip. In this context, the term “grip” means the same as the lower receiver of the weapon.

In a structurally simple design of the invention, the first engaging element on the grip can be a projection, in particular a web, lobe, pin, or protrusion. The corresponding second engaging element can be a recess, hole, or groove on the corresponding component, e.g. the barrel.

In another design of the invention, the second engaging element can be at the back of the respective component, e.g. the barrel.

The second engaging element can also be formed between a stop with a positioning pin and the back end of the respective component, e.g. the barrel. The end forms a connection on a barrel to a barrel nut that can be tightened onto it. A positioning pin ensures that the barrel is inserted correctly into the receiver. The barrel with a stop, or positioning pin, and connection, is disclosed in DE 10 2017 002 242 A1 by the applicant, which is incorporated herein. In this regard, reference is made specifically to Paragraph [0064].

The barrel nuts for the two firearms can have different thread pitches and/or lengths, thus preventing confusion.

In another design of the invention, the recess can be formed at the front end of a component, in particular the magazine receiver. The projection can also be formed at the upper front end of the component, in particular the magazine. The width of the projection can be the same or less than the width of the magazine.

In a simple design of the invention, the recess is a vertical groove in the magazine receiver. The corresponding projection can be a web or lug.

The component, specifically the grip, can have a first safety element extending over a circumference, designed to engage with a second element, e.g. on the barrel, to obtain a form-fitting connection.

As the drawings show, there are numerous possible designs for the safety elements that can be derived by the person skilled in the art from the claims and the following descriptions of the drawings, as well as from the drawings.

Description of the Drawings

Exemplary embodiments of the invention are explained below in greater detail in reference to the drawings. Therein:

- Fig. 1 shows a perspective side view of part of a first embodiment of a self-loading firearm in the form of the assault rifle HK433;
- Fig. 2 shows a perspective side view of part of a first embodiment of a self-loading firearm in the form of the assault rifle HK437;
- Fig. 3a shows a side view of the barrel for the self-loading firearm in Fig. 1;
- Fig. 3b shows a side view of the barrel for the self-loading firearm in Fig. 2;
- Fig. 4a shows a side view of the magazine for the self-loading firearm in Fig. 1;
- Fig. 4b shows a side view of the magazine for the self-loading firearm in Fig. 2;
- Fig. 5a shows a perspective side view of part of the grip for an HK433 with the magazine for the HK433 fully inserted;
- Fig. 5b shows a perspective side view of part of the grip for the HK433 with a magazine for the HK437 partially inserted;
- Fig. 6a shows a perspective side view of part of the grip for an HK437 and the magazine for the HK437 fully inserted;
- Fig. 6b shows a perspective side view of part of the grip for an HK437 and the magazine for an HK433 partially inserted;
- Fig. 7a shows a schematic side view of a .300 caliber Blackout/Whisper cartridge;
- Fig. 7b shows a schematic side view of a 5.56 NATO caliber cartridge;
- Fig. 8 shows a side view of part of another embodiment of the assault rifle HK433;
- Fig. 9 shows a side view of part of another embodiment of the assault rifle HK437;
- Fig. 10a shows a side view of the magazine for the self-loading firearm in Fig. 8;
- Fig. 10b shows a side view of the magazine for the self-loading firearm in Fig. 9;
- Fig. 11a shows a side view of the grip for the self-loading firearm in Fig. 8;
- Fig. 11b shows a partially cutaway side view of the grip for the self-loading firearm in Fig. 9;
- Fig. 12a shows the grip for the self-loading firearm in Fig. 8 from below;
- Fig. 12b shows the grip for the self-loading firearm in Fig. 9 from below;

- Fig. 13a shows the grip for the self-loading firearm in Fig. 8 from below, next to a separate barrel receiver;
- Fig. 13b shows the grip for the self-loading firearm in Fig. 9 from below, next to a separate barrel receiver;
- Fig. 14a shows the barrel receiver for the self-loading firearm in Fig. 8 from the front;
- Fig. 14b shows the barrel receiver for the self-loading firearm in Fig. 9 from the front;
- Fig. 15a shows the barrel receiver for the self-loading firearm in Fig. 8 from above;
- Fig. 15b shows the barrel receiver for the self-loading firearm in Fig. 9 from above;
- Fig. 16a shows a side view of the upper receiver of the self-loading firearm in Fig. 8, with the barrel receiver thereon;
- Fig. 16b shows a side view of the upper receiver of the self-loading firearm in Fig. 9, with the barrel receiver thereon;
- Fig. 17a shows a side view of the barrel for the self-loading firearm in Fig. 8;
- Fig. 17b shows a side view of the barrel for the self-loading firearm in Fig. 9;
- Fig. 18a shows a side view of the barrel for the self-loading firearm in Fig. 8, with the locking element;
- Fig. 18b shows a side view of the barrel for the self-loading firearm in Fig. 9, with the locking element;
- Fig. 19a shows a side view of the barrel for the self-loading firearm in Fig. 8 with the locking element in a partially cutaway illustration;
- Fig. 19b shows a side view of the barrel for the self-loading firearm in Fig. 9 with the locking element in a partially cutaway illustration;
- Fig. 20a shows another embodiment of a loader for a magazine for the assault rifle HK433 from above;
- Fig. 20b shows another embodiment of a loader for a magazine for the assault rifle HK437 from above;
- Fig. 21a shows a perspective view of another embodiment of magazine for the assault rifle HK433 that is complementary to the loader in Fig. 20a; and
- Fig. 21b shows a perspective view of another embodiment of magazine for the assault rifle HK437 that is complementary to the loader in Fig. 20b.

The functioning of the encoding safety system shall be explained below in reference to the drawings. Figs. 1 and 2 show self-loading firearms and their main components for which the use of the encoding safety system is intended.

Fig. 1 shows a section of a self-loading firearm 1. This firearm 1 is a 5.56 NATO caliber assault rifle (HK433). This shall be referred to below as the smaller caliber. The person skilled in the art is familiar with the assault rifle HK433 and how it functions, e.g. from DE 10 2017 002 242 A1, for which no further explanation is needed other than what is necessary for understanding the invention.

Fig. 1 shows a barrel 2, and a grip 7, forming the lower receiver for the self-loading firearm 1. As disclosed in DE 10 2017 002 242 A1, the barrel 2 has a locking socket or locking element 3 at the back. There is an integral circumferential stop 4 at the front of the locking element 3 with a positioning pin 5 at the bottom in the middle that extends toward the back. This ensures that the barrel 2 is always placed the barrel receiver 8 in the same way when assembling the firearm. There is a connecting section at the back end 6 of the locking element 3, or back end 6 of the barrel 2, onto which a barrel nut is placed and tightened. There are four notches 6a distributed evenly over the circumference at 90° increments that ensure the barrel is securely received in the receiver, or grip 7. The grip 7 also has a magazine slot 17 or magazine receiver.

Fig. 2 shows a section of a self-loading firearm 1a, the assault rifle HK437, which is nearly identical to the HK433, but is chambered in .300 Blackout. The .300 Blackout is also referred to herein as the larger caliber.

The assault rifle HK437 is distinguished by a modified grip 7a with a modified barrel 2a and modified magazine receiver 17a, or magazine slot. The grip 7a has a first engaging element 9 where the barrel receiver 8 is located, which is a circumferential projection in the form of a web, forming part of a first safety element to prevent confusion.

Unlike the barrel 2 for the HK433, the barrel 2a of the HK437 has a second engaging element 10 at the back in the form of a complementary groove to the web 9, thus preventing the attachment

thereto of another barrel. When assembled, the web 9 on the grip 7a fits into the groove 10 in the barrel 2a in a form-fitting manner.

The upper receiver, which is not shown, can have a web corresponding to the groove 10 in the barrel 2a for coupling it to the grip 7a.

Figs. 3a and 3b show side views of the barrel 2 and 2a for purposes of comparison. The web 9 in the grip 7a and the groove 10 cut into the connecting section form a safety element on the barrel 2a for the HK437. The HK433 does not have a groove on the barrel 2, which therefore cannot be attached to the grip 7a. This forms a safety element on the HK433.

Figs. 4a and 4b show the HK433 magazine 11 and the HK437 magazine 11a. The HK437 magazine 11a has a web 13 on the front that corresponds to a recess 12 in the front inner wall of the magazine slot 17a in the HK437 grip. This recess 12 extends upward in the magazine slot 17a far enough that only the HK437 magazine can be fully inserted and snapped in place in the HK437 grip.

The HK433 magazine 11 has a stop 14 on the back in this embodiment. The stop 14 strikes the grip 7 when the magazine 11 is snapped in place, specifically at the lower edge thereof. This prevents the magazine from being inserted too far into the slot, which could result in a malfunctioning. This stop could also be formed on the HK437 magazine 11a.

Figs. 5a and 5b show the HK433 magazine 11 inserted into the HK433 grip 7 and the HK433 magazine 11 inserted into the HK433 grip 7 respectively. It is impossible to fully insert the HK437 magazine 11a into the magazine slot 17 because there is no recess 12 therein for the web 13. In other words, the HK433 magazine slot 17 blocks further insertion of the HK437 magazine 11a into the HK433 grip after it has been inserted about 20-30% of the way.

Figs. 6a and 6b both show the HK437 grip 7, once with the HK433 magazine 11 (Fig. 6b) and once with the HK437 magazine 11a (Fig. 6a). Fig. 6a shows the HK437 magazine 11a inserted

into the HK437 magazine slot 17a in the HK437 grip. Fig. 6b shows the HK433 magazine 11 inserted into the HK437 magazine slot 17a in the HK437 grip.

The HK433 magazine 11 cannot be fully inserted into the magazine receiver 17a in the HK437 grip 7 and snapped in place, because the magazine slot 17 blocks the magazine 11a with the webs 22 formed on its inner walls. See also Figs. 11b and 12b, and the descriptions thereof.

The assault rifle HK437 has two safety elements in the embodiment shown herein. A first safety element is formed by the recess 12 in the magazine receiver 17a inside the HK437 grip 7a, which interacts with the corresponding web 13 on the HK437 magazine 11a.

The HK433 grip 11 does not have a recess 12, making it impossible to fully insert the HK437 magazine 11a into the magazine receiver 17 in the HK433 grip 7 and snap it in place, because the magazine slot 17 blocks the web 13 when the magazine 11a is inserted.

Figs. 7a and 7b show the .300 Blackout/Whisper cartridge (larger caliber 16) and the 5.56 NATO cartridge (smaller caliber 15). The 5.56 mm and .300 Blackout/Whisper each have the same 5.56 mm NATO shell, such that their outer dimensions are nearly identical. This is indicated in Fig. 7 by the respective lengths k and diameters d. The external differences lie in the different diameters of the projectiles, in particular at the shoulder and neck of the shell.

Fig. 8 and 9 show other embodiments of the HK433 (Fig. 8) and HK437 (Fig. 9) assault rifles.

The partially assembled HK433 assault rifle shown in Fig. 8 has a magazine 11 inserted and snapped in place in the grip 7. The upper receiver 19 is placed thereon, and the barrel 2 is attached. The trigger, trigger guard and grip are not assembled.

The partially assembled assault rifle HK437 shown in Fig. 9 contains a magazine 11a inserted and snapped in place in the grip 7a. The upper receiver 19a is placed thereon, and the barrel 2a is attached. The trigger, trigger guard and grip are not assembled.

Both magazines 11 and 11a have a base 12 and 12a, respectively, that can be slid and pivoted.

Fig. 10a shows a side view of the HK433 magazine, and Fig. 10b shows a side view of the HK437. Fig. 11a shows a partially cutaway side view of the HK433 grip, and Fig. 11b shows a side view of the HK437 grip. Figs. 12a and 12b show the HK433 grip and the HK437 grip from below.

The HK437 magazine 11a also has a web 13 on the front that corresponds to a recess 12 in the front wall of the magazine slot 17a in the HK437 grip (see Fig. 11a). This recess 12 extends vertically into the magazine slot 17a far enough that only the HK437 magazine can be fully inserted and snapped in place in the HK437 grip.

There are also bevels 21 on both sides of the HK473 magazine at the top, on the outer corners of the magazine 11a, which are complementary to webs 22 formed on both sides of the magazine slot 17a in the HK437, protruding inward (see Figs. 11b, 12b and 13b). These webs 22 extend downward in the magazine slot 17a over 15% to 25% of the length thereof. They only allow the HK437 magazine 11a, with its bevels 21, to be fully inserted and snapped in place in the HK477 magazine slot 17a.

The same webs 22 prevent the HK433 magazine 11 from being fully inserted and snapped in place in the HK437 magazine slot, because the upper edge of HK433 magazine 11 strikes and is blocked by these webs.

The HK433 magazine 11 (see Fig. 10a) also has a stop 14 at the back. There are no webs or bevels at the front.

Fig. 13a shows the HK433 grip 7 from below, with a separate barrel receiver 8 next to it, and Fig. 13b shows the HK437 grip 7a for the self-loading firearm in Fig. 9 from below, with a separate barrel receiver next to it.

The HK433 grip 7 has a recess or receiver 35 for the barrel receiver 8 on both sides, at the bottom of the front end (see Figs. 11a, 12a, 13a). The HK437 grip 7a also has a recess or receiver 35 for the barrel receiver 8a on both sides, at the bottom of the front end (see Figs. 11b, 12b, and 13b).

The barrel receiver 8 for the HK433 is shown from the front in Fig. 14a and from above in Fig. 15a. The barrel receiver 8 for the HK433 has two pins 23 on both sides at the back, on the bottom, which are at a right angle to the bore axis of the firearm, with which the barrel receiver 8 is placed in the receiver 35 on the lower receiver 7. The pins 35 for the HK433 are thinner, i.e. with a smaller diameter, and are longer than the pins 35a for the HK437, and complementary to the inner dimensions of receiver 35 for the HK433.

The barrel receiver 8a for the HK437 is shown from the front in Fig. 14b and from above in Fig. 15b. The barrel receiver 8a for the HK437 also has two pins 35a on both sides at the back, on the bottom, which are at a right angle to the bore axis of the firearm, with which the barrel receiver 8a is placed in the receiver 35a on the lower receiver 7a. The pins 35a for the HK437 are thicker, or wider and shorter than the pins 35 for the HK433, and complementary to the inner dimensions of the receiver 35a for the HK437.

The receiver 35 is complementary to the outer dimensions of the pins 23 on the HK433. The receiver 35a is also complementary to the pins 23a for the HK437. Because of the different sizes and shapes of the pins 23 and 23a, and the different sizes and shapes of the receivers 35 and 35a, it is impossible to attach the barrel receiver 8 for the HK433 to the lower receiver 7a of the HK437. It is also impossible to attach the barrel receiver 8a for the HK437 to the lower receiver 7 of the HK433 for the same reason.

The barrel receiver 8a for the HK437 also has two webs or lugs 27a on the front, with a recess 25a between them. These lugs 27a and the recess 25a accommodate the locking element 3a and its positioning pins 5a on the barrel 2a (see Figs. 18b and 19b). The locking element 3a fits onto the lugs 27a such that they can slide along the outer surface of the locking element 3a until the

positioning pins 5a fit into the recess 25a. The outer shape of the locking element may have recesses or bevels that are complementary to the lugs 27a.

The positioning pins 5a on the HK437 are longer and thicker than the positioning pins 5 on the HK433. The barrel receiver 8 for the HK433 cannot be attached thereto and a barrel nut for the HK433 cannot be placed therein. Consequently, the barrel receiver 8 for the HK433 cannot be attached to the locking element 8a for the HK437.

The barrel receiver 8 on the HK433 does not have a web or lug 27a on the front, or a recess. This ensures that only the HK437 barrel 2a can be placed in the HK437 barrel receiver 8a.

Fig. 16a shows a side view of the upper receiver 19 for the HK433, with the barrel receiver 8 thereon. Fig. 16b shows a side view of the upper receiver 19a for the HK437, with the barrel receiver 8a thereon.

Fig. 17a shows a side view of the barrel 2 for the HK433, Fig. 18a shows a side view of the barrel 2 with the locking element 3 thereon, and Fig. 19a shows a side view of the barrel 2 with the locking element 3 thereon, in a partially cutaway illustration in which a cartridge chamber 29 can also be seen.

Fig. 17b shows a side view of the barrel 2a for the HK437, Fig. 18b shows a side view of the barrel 2a with the locking element 3a thereon, and Fig. 19b shows a side view of the barrel 2a with the locking element 3a thereon, in a partially cutaway illustration in which a cartridge chamber 29a can also be seen.

The two partially cutaway illustrations in particular show that the lengths L and L'' of the sections on the end of the HK437 barrel 2a and in the locking element 3a are different than the lengths La and Lb of the sections on the end of the HK433 barrel 2 and in the locking element 3. The lengths L and La are the lengths of the threaded sections 33 and 33a, respectively, the ends of which are stepped 31 and 31a. The threaded section 31a, with the length La in the HK437 is significantly longer than the threaded section 33 with the length L in the HK433. Consequently,

when attempting to attach the HK433 locking element 3 to the barrel 2a for the HK437, it cannot be fully screwed together, because the threaded section of the locking element 3 for the HK433 is too short. In other words, the HK437 barrel 2a cannot be fully screwed into the HK433 locking element 3.

Furthermore, the inner diameter of the HK437 locking element 3a in the section with the length L_b is smaller than the inner diameter of the locking element 3 for the HK433 in the section with the length L'' . Consequently, when attempting to attach the HK437 locking element 3a to the barrel 2 for the HK433, it cannot be fully screwed together. In other words, the HK433 barrel 2 cannot be fully screwed into the HK437 locking element 3a.

Fig. 20a shows a loader 37 for an assault rifle HK433 magazine 11 from above, and Fig. 20b shows another loader 37a for an assault rifle HK437 magazine 11a.

These loaders 11, 11a move cartridges inside the respective magazines 11, 11a upward with a spring, not shown, in the conventional manner, toward the opening at the top of the magazine, so that the cartridges can be removed therefrom and loaded into the chamber, not shown, through the breechblock, not shown, when reloading in the conventional manner.

It is fundamentally possible to shoot .300 caliber Blackout/Whisper cartridges (larger caliber 16) from a 5.56x45 magazine (HK433 magazine 11). Because the neck of the shell for the .300 Blackout/Whisper cartridges is wider than that for the 5.56 cartridge, due to the bullet caliber 7.62, the 5.56 magazine 11 cannot be entirely filled with .300 Blackout/Whisper cartridges, and the .300 Blackout/Whisper cartridges also become tilted, which may result in malfunctioning.

In this regard, the internal geometry of the .300 Blackout/Whisper magazine 11a has been adapted accordingly in this exemplary embodiment. In addition, the loader 11a is adapted to the internal geometry of the Blackout magazine 11a.

A safety element is formed on the loader 37, 37a in the magazine 11, 11a by labeling or marking it, as shown on the loader 37a, or by the different shapes and sizes of the loaders 37 and 37a, and the internal geometries of the magazines 11 and 11a.

Fig. 21a shows a perspective view of another embodiment of a magazine for the assault rifle HK433 that is complementary to the loader in Fig. 20a, and Fig. 21b shows a perspective view of another embodiment of a magazine for the assault rifle HK437 that is complementary to the loader in Fig. 20b.

The HK433 loader 37 has a recess 39 on the left side, which is complementary to a first guide rib 43 for the loader in the HK433 magazine. There is also a second recess 41, which is complementary to a second guide rib 45 for the loader in the HK433 magazine 11. It also has a rear guide rib 40 at the back end, which is complementary to a recess 47 on the back internal wall of the magazine 11. These ribs 43 and 45, as well as the recess 47, extend over nearly the entire length of the inner wall of the magazine 11 and guide the loader 37 inside the magazine 11 when transporting cartridges upward. The loader 37 is placed in the magazine 11 from below, and pushed upward by the spring therein, not shown. As the loader 37 moves inside the magazine 11, it is pushed over the recesses 39, against the two guide ribs 43 and 45 and the back rib 40 into the recess 47. There is another recess 51 on the front of the HK433 loader 37 that prevents the loader 37 from tilting inside the magazine 11 by interacting with the front rib 49 in the HK433 magazine 11.

The HK437 loader 37a also has a first recess 39a on the left side, which is complementary to a first guide rib 43a for the loader in the HK437 magazine. There is also a second recess 41a, which is complementary to a second guide rib 45a in the HK433 magazine 11. It also has a rear guide rib 40a at the back end, which is complementary to a recess 47a on the back internal wall of the magazine 11a. These ribs 43a and 45a, as well as the recess 47a, extend over nearly the entire length of the inner wall of the magazine 11a and guide the loader 37a inside the magazine 11a when transporting cartridges upward. The loader 37a is placed in the magazine 11a from below, and pushed upward by the spring therein, not shown. As the loader 37a moves inside the magazine 11a, it is pushed over the recesses 39a, against the two guide ribs 43a and 45a and the

back rib 40a into the recess 47a. There is another recess 51a on the front of the HK437 loader that prevents the loader 37a from tilting inside the magazine 11a by interacting with the front rib 49a in the HK433 magazine 11.

The width B1 of a front guide between the recesses 39 and 41 of the HK433 loader 37 is less than the width B1a of the front guide between the recesses 39a and 41 of the HK437 loader 37a. By way of example, the width B1 can be ca. 14mm, and the width B1a can be ca. 15 mm.

The width B2 of the recess 41 on the HK433 loader 37 is also less than the width B2a of the recess 41 on the HK437 loader 37a. By way of example, the width B2 can be ca. 3 mm, and the width B2a can be ca. 7 mm, such that the width B2a is more than twice the width B2.

These measures result in the recesses 39 and 41, and 39a and 41a fitting to the respective guide ribs in the HK433 and HK437 magazines, and the complementary guide ribs 43, 45 and 43a and 45a therein.

The width B3 between the guide ribs 43 and 45 in the HK433 magazine 11 is less than the width B3a between the guide ribs 43a and 45a in the HK437 magazine 11a. By way of example, the width B3 in the HK433 magazine 11 can be ca. 14mm, and the width B3a in the HK437 magazine 11a can be ca. 16 mm.

The width B4 of the guide rib 45 in the HK433 magazine 11 is less than the width B4 of the guide rib 45a in the HK437 magazine 11a. By way of example, the width B4 can be ca. 2 mm, and the width B4a can be ca. 6 mm, such that it is more than twice that of width B4. These widths B1, B1a to B4, B4a may of course differ.

Due to the different internal shapes and sizes of the HK433 and HK437 magazines 11 and 11a, and the HK433 and HK437 loaders 37, 37a, it is impossible to place the HK433 loader 37 in the HK437 magazine 11a, and the HK437 loader 37a in the HK433 magazine 11. The wide loader guide ribs 43a, 45a in the inner wall of the HK437 magazine 11a prevent placing the HK433

loader 37 therein. The wide front guide B1 in the HK437 loader 37a prevents placing it in the magazine housing for the HK433 magazine 11.

These safety elements prevent placement of the HK433 loader 37 in the HK437 magazine 11a, or placement of the HK437 loader 37a in the HK433 magazine 11, thus preventing malfunctions.

The encoding safety system obtained with the invention, the components of the weapons obtained with the invention, and the self-loading firearms obtained with the invention, for use in the encoding safety system obtained with the invention increase the safety of self-loading firearms of different calibers.

Other embodiments of the invention can be derived by the person skilled in the art from the following claims and the drawings.

List of Reference Symbols

1	self-loading firearm, assault rifle HK433
1a	self-loading firearm, assault rifle HK437
2	barrel HK433
2a	barrel HK437
3	locking element HK433
3a	locking element HK437
4	stop
5	positioning pins
6	back end, connecting section
6a	notches
7	grip, lower receiver HK433
7a	grip, lower receiver HK437
8	barrel receiver HK433
8a	barrel receiver HK437
9	first engaging element, circumferential web
10	second engaging element, circumferential groove
11	magazine HK433
11a	magazine HK437
12	recess in magazine slot
13	web
14	stop
15	caliber, NATO 5.56 (5.56 mm x 45)
16	caliber, 300 Blackout (.300 BLK)
d	diameter
k	length
17	magazine slot HK433 not shown in Fig. 6b
17a	magazine slot HK437
19	upper receiver HK433
19a	upper receiver HK437

20 magazine base HK433
20a magazine base HK437
21 part shaped to fit web 22
22 web in magazine slot HK437
23 pin HK433
23a pin HK437
25a recess on barrel receiver HK437
27a web on barrel receiver HK437
29 cartridge chamber HK433
29a cartridge chamber HK437
31 step HK433
31a step HK437
33 threaded section HK433
33a threaded section HK437
35 receiver(s) HK433
35a receiver(s) HK437
L, L'' lengths, HK433
La, Lb lengths, HK437
37 loader HK433
37a loader HK437
39 first recess on HK433 loader
39a first recess on HK437 loader
40 rear guide rib on HK433 loader
40a rear guide rib on HK437 loader
41 second recess on HK433 loader
41a second recess on HK437 loader
43 first loader guide rib on HK433 magazine
43a first loader guide rib on HK437 magazine
45 second loader guide rib on HK433 magazine
45a second loader guide rib on HK437 magazine
47 recess in magazine wall of HK433

- 47a recess in magazine wall of HK437
- 49 front rib in HK433 magazine
- 49a front rib in HK437 magazine
- 51 front recess in HK433 loader
- 51a front recess in HK437 loader
- B1 width between recess 39 and 41 in HK433
- B1a width between recess 39a and 41a in HK437
- B2 width of recess 41 in HK433
- B2a width of recess 41a in HK437
- B3 width between guide ribs 43 and 45 in HK433
- B3a width between guide ribs 43a and 45a in HK437
- B4 width of guide rib 45 in HK433
- B4a width of guide rib 45a in HK437

Claims

1. An encoding safety system for firearms (1, 1a) of the same type but different calibers for preventing confusion of at least one component (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a), comprising:
 - at least one first firearm (1) of a first caliber, or at least one component (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a) thereof,
 - at least one second firearm (1a) of a second, different caliber, or at least one component (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a) thereof,
 - at least one safety element on the first and/or second firearm (1, 1a), or the at least one component (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a) thereof, which is designed to prevent attachment of the at least one (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a) of the at least one first firearm (1) to the at least one second firearm (1a), andat least one second safety element on the first and/or second firearm or the at least one component (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a) thereof, which is designed to prevent attachment of the at least one component (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a) of the at least one second firearm (1a) to the at least one first firearm (1).
2. The encoding safety system according to claim 1, wherein the at least one component (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a) on the first and/or second firearm comprises at least one magazine (11, 11a), a loader (37, 37a), a grip/lower receiver (7, 7a), an upper receiver (19, 19a), a barrel receiver (8, 8a), a barrel (2, 2a), a locking element (3, 3a), a breechblock, and/or a breechblock bolt.
3. The encoding safety system according to claim 1 or 2, wherein the at least one first and/or second safety element is at least one mechanical structure or at least one recess on at least one component (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a), which allow assembly of the components (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a) of the same caliber, and prevents assembly of components of different calibers.

4. The encoding safety system according to any of the preceding claims, in which the at least one first and/or second safety element is an engaging element on the at least one component (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a), which enables an engagement and/or form-fitting connection between at least two components (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a) with a corresponding second engaging element on a second component (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a) of the second firearm (1a) of the same caliber for assembling the first or second firearm (1, 1a), but prevents an engagement and/or form-fitting connection, and therefore the assembly, of the first firearm (1) with a component (2a, 3a, 7a, 8a, 11a, 19a, 37a) of the second firearm (1a) and vice versa.
5. The encoding safety system according to any of the preceding claims, in which the at least one first and/or second safety element is an enlargement or reduction of at least part of the at least one component (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a).
6. The encoding safety system according to any of the preceding claims, in which the at least one first and/or second safety element is an visual and/or tactile marker, and/or in addition to a first and/or second safety element, there is also at least one visual and/or tactile marker.
7. The encoding safety system according to any of the preceding claims, in which the at least one first and/or second safety element is provided on some or all of the components (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a) of the first and second firearms (1, 1a).
8. Components (2, 2a, 3, 3a, 7, 7a, 8, 8a, 11, 11a, 19, 19a, 37, 37a) of a firearm (1, 1a) with at least one safety element for use in the encoding safety system according to any of the preceding claims.
9. A firearm (1, 1a) of a first and/or second caliber that has at least one safety element for use in the encoding safety system according to any of the claims 1 to 7.