

Key for a cylinder lock

The invention relates to a key for a cylinder lock with the features of the preamble of the independent patent claim.

Such a key comprises at least one encoded lateral surface, which extends along the longitudinal direction of the key and on which at least one code to be read in the cylinder lock is provided, wherein the code comprises a first and a second reading surface, which extend in the longitudinal direction of the key and are arranged offset from one another in a transverse direction of the key. The transverse direction is a direction normal to the longitudinal direction of the key, which usually lies in the plane of a key surface.

Such keys with offset reading surfaces are known *per se* from the prior art, wherein the reading surfaces extend constantly surface-parallel to a central longitudinal plane of the key and are read with corresponding reading elements in the lock. The offset of the reading surfaces in the transverse direction usually serves to allow a plurality of variations of the code at a certain scanning position in the longitudinal direction. Thus, a plurality of reading surfaces which are offset in the transverse direction of the key can be provided both on the broad side and the narrow side of a typical flat key in the form of incisions by milling, the position of which can be varied in the transverse direction and the depth relative to the lateral surface of the key.

However, a problem of such keys is that only a limited number of discrete and **robustly** detectable positions and depths of the reading surfaces can be provided so that the number of variations is limited.

An object of the invention is to solve this problem and to provide a key with codes, which are designed in such a way that they offer a plurality of additional variation possibilities. Further, the formed code should be as difficult to copy and to reproduce as possible.

According to the invention, this object is solved by the features of the characterizing part of the independent patent claim.

The invention provides that the reading surfaces are arranged offset from one another in the longitudinal direction of the key, and that their cross-section has the shape of a continuous and preferably periodical curve. Thus, the reading surfaces are not only offset in the transverse direction, but also in the longitudinal direction, and do not extend surface-parallel to the central longitudinal plane of the key, but keep a variable, continuous distance to it.

Preferably, the cross-sectional curves of the reading surfaces are designed as sine curves or cosine curves; however, other, preferably periodical continuous curve shapes are provided as well. For example, the cross-sectional curves may be trapezoidal or triangular curves with preferably rounded edges. Particularly preferably, the cross-sectional curves are formed over at least one full period length.

The respective curve may be predefined. For example, a periodical sine curve or cosine curve with a given wave length and amplitude may be predefined over an angle of at least 0° to 360° (two half-waves) or 0° to 540° (three half-waves). Preferably, the two reading surfaces have identical amplitudes and identical wave lengths. Preferably, the reading surfaces each start with the same amplitude value, which, due to the displacement in the longitudinal direction, does not lie at the same position in the longitudinal direction of the key.

The reading surfaces may have substantially the same length in the longitudinal direction so that the two curves, having passed a maximum value, a zero crossing and a minimum value, for example, end at the same amplitude value. The invention is not

limited to the use of sine curves or cosine curves as the cross-sectional curves of the reading surfaces.

The features of the invention ensure that the two reading surfaces have a depth relative to the central longitudinal plane and in the longitudinal direction of the key which varies and is therefore difficult for criminals to scan or copy, but which are in a unique relationship to one another and are therefore simple to manufacture.

By simply varying the offset of the two reading surfaces, a wide variety of code variations can be produced. For example, the offset in the longitudinal direction can be varied in multiples of an angle of the curves, for example 15° or 30° , in order to obtain different codes.

According to the invention, it may further be provided that the reading surfaces are longitudinally offset from one another in such a way that the curves formed in the cross-section are longitudinally offset from one another by an angle of preferably about 45° to 135° , preferably about 90° , so that the reading surfaces intersect along the longitudinal direction at a plurality of points, which serve as scanning points of the code. When sine or cosine curves are used, this has the particular technical advantage that the intersections of the two reading surfaces are located in that region in which they have the greatest different slope. If the sine curves are formed over one period (two half-waves), i.e. 0° to 360° , this results in two intersections; if the sine curves are formed over an angle of 0° to 540° (three half-waves), this results in three intersections, which can be used for scanning. Scanning at these intersections can be realized in a particularly robust manner and is not very error-prone.

The curves, i.e. the respective cross-sections of the reading surfaces, can have a period length of about 4 mm to 25 mm, preferably about 7 mm to 15 mm, particularly preferably about 8 mm to 12 mm. This period length corresponds in each case to an angular range of 0° to 360° . However, it may also be provided that the curves are formed over more than one period, so that the entire extension of the reading surface is significantly longer than the mentioned period length of the curve.

In particular, it may be provided that the code and thus the reading surface extends only in sections over part of the longitudinal extension of the key. However, it may also be provided that the code and thus the reading surface extends over substantially the entire longitudinal extension of the key, i.e. from the key bow to the key tip.

The amplitude of the curves can be about 0.1 mm to 1.5 mm, preferably 0.3 mm to 1.0 mm, particularly preferably 0.5 mm to 0.8 mm. However, the selected amplitude depends on the available material thickness of the key at the position of the code and can also be significantly larger, for example up to 3 mm.

The reading surfaces can be formed as recesses such as by milling or embossing the lateral surface. At the transition to the lateral surface, inlet bevels may optionally be formed at both ends of the respective recesses in order to facilitate the insertion and removal of the scanning elements of the lock. In this case, the inlet bevels are preferably not part of the reading surfaces. The inlet bevels may be linear or non-linear. For example, the inlet bevel may have a course in the shape of a circle segment when using a milling tool. In contrast, the inlet bevel may have any course, in particular a linear course, when using an embossing punch.

In the code, preferably between the first reading surface and the second reading surface, and preferably on one of the scanning points formed by the intersections of the reading surfaces, a magnetic element may be arranged. This may serve to cooperate with a reading element arranged in the lock.

The reading element arranged in the lock may be brought from a locking state to a release state by the magnetic action, wherein the reading element itself may comprise a magnetic element. Thus, the reading element in the lock does not have to be loaded with a spring load. Furthermore, a minimal clearance in the mounting of the reading element can be compensated for by the magnetic action as the magnetic element pulls the reading element into the right position for engaging the reading surfaces. The magnetic element may be arranged along the reading surfaces centrally in the longitudinal direction in order to avoid becoming lodged. This is also the reason for why, when using multiple reading elements, they may be arranged symmetrically in the longitudinal direction.

The invention may provide that the key is a flat key, wherein the lateral surface is the broad side of the key and extends in a first transverse direction. However, it may also be provided that the key is a flat key, wherein the lateral surface is the narrow side of the key and extends in a second transverse direction. The first transverse direction and the second transverse direction are orthogonal to one another and are each normal to the longitudinal direction of the key. Combinations may also be provided, wherein a first code according to the invention is located on a broad side of the key and a second code according to the invention is located on a narrow side of the key.

The codes on the lateral surfaces may be identical so that the key is a reversible key, which may lock an associated lock in two orientations. The codes on the lateral surfaces may also be different so that the key is a non-reversible key, which may lock an associated lock in only one orientation.

The invention may provide that the reading surfaces have an extension of 4 mm to 25 mm, preferably about 7 mm to 15 mm, particularly preferably about 8 mm to 12 mm, in the longitudinal direction. The extension of the reading surfaces may coincide with the period length of the curve; however, it may also be provided that the reading surface extends over more than one period length.

The reading surfaces may have an extension of about 1 mm to 10 mm, preferably 1.5 mm to 3.5 mm, particularly preferably about 2.0 mm to 3.0 mm, in the transverse direction. However, the extension in the transverse direction is primarily limited by the accuracy of the tool used for the production and the entire width of the key in the transverse direction.

The invention may provide that the reading surfaces are designed as the groove bottom of a preferably conical or rectangular incision by milling of the lateral surface, wherein the reading surfaces do not protrude beyond the outer cross-sectional profile of the key.

The curve formed in the cross-section of the reading surfaces may be designed in such a way that it just reaches the lateral surface with its highest amplitude, so that the depth of the reading surface relative to the lateral surface substantially corresponds to twice the amplitude value.

The invention may also provide that the reading surfaces are designed as the tip face or ridge of a preferably conical or rectangular material bar, which protrudes from the lateral surface, wherein the reading surfaces protrude beyond the outer cross-sectional profile of the key. The curve formed in the cross-section of the reading surfaces is designed in such a way that it just reaches the lateral surface with its lowest amplitude, so that the height of the reading surface relative to the lateral surface substantially corresponds to twice the amplitude value.

However, according to the invention, combinations are possible as well. For example, a key according to the invention may have a first code, the reading surfaces of which are formed as the groove bottom of a preferably conical or rectangular incision by milling of a first lateral surface, the reading surfaces not protruding beyond the outer cross-sectional profile of the key, and a second code, the reading surfaces of which are formed as the tip face or ridge of a preferably conical or rectangular protruding material bar of this or another lateral surface, these reading surfaces protruding beyond the outer cross-sectional profile of the key.

Further, the invention relates to a system of a key according to the invention and a scanning element of a cylinder lock, which is configured to read the code, in particular the reading surfaces, in order to lock the cylinder lock.

The scanning element may comprise a pin with a scanning tip, wherein the scanning tip is adapted to the shape of the reading surfaces at the scanning points. The scanning points may be located at those points along the longitudinal direction of the key, at which the curves of the reading surfaces intersect. Correspondingly, the scanning element may be provided at those points in the keyway of the cylinder lock at which the intersections of the curves of an authorized key are provided.

The scanning element may also be designed as or comprise a sideshift with an end face, the end face being adapted to the shape of the reading surfaces. In this embodiment, the scanning element does not only scan the intersections of the curves, but also the entire shape of the reading surfaces.

The sideshift may comprise a magnetic element in the area of its end face, which is configured to cooperate with the magnetic element of the key, in order to, in accordance with the invention, correctly position the sideshift relative to the reading surface.

Further features according to the invention result from the patent claims, the drawings and the description of the exemplary embodiments. The invention is now explained in more detail on the basis of multiple non-limiting exemplary embodiments. In the figures:

Figs. 1a to 1e show a first exemplary embodiment of a key according to the invention and scanning elements according to the invention in the shape of scanning pins;

Figs. 2a to 2e show a second exemplary embodiment of a key according to the invention and scanning elements according to the invention in the shape of a sideshift;

Figs. 3a to 3e show a third exemplary embodiment of a key according to the invention and scanning elements according to the invention in the shape of laterally extending scanning pins;

Figs. 4a to 4d show a fourth exemplary embodiment of a key according to the invention with a combination of two codes in the shape of incisions by milling and protruding material bars.

Figs. 1a to 1e show a first exemplary embodiment of a key 1 according to the invention for a cylinder lock, which is not shown. In this exemplary embodiment, the key 1 is a flat key with two opposite narrow sides/end faces and two opposite broad sides/flat sides. An encoded lateral surface 3 extends along the longitudinal direction 2 of the key 1, wherein it is a broad side, which extends in the transverse direction 6. The transverse direction 6 is substantially orthogonal to the longitudinal direction 2.

The lateral surface 3 is profiled in a conventional manner and has a code 4 to be read in the cylinder lock. The code 4 is only provided in sections along part of the longitudinal extension of the key 1. The section D-D along the code 4 is shown in detail in Fig. 1b. It is shown that the code 4 comprises a first reading surface 5, which extends in the longitudinal direction 2 of the key 1, and a second reading surface 5', which also extends in the longitudinal direction 2 of the key 1. In this exemplary embodiment, the

reading surfaces 5, 5' are each designed as the groove bottom of a conical incision by milling 9, 9' of the lateral surface 3 and do not protrude beyond the outer cross-sectional profile of the key 1, as also shown in Fig. 1e.

The reading surfaces 5, 5' are arranged offset from one another in the transverse direction 6 of the key 1, wherein a slight overlap in the range of less than 10 % of its width is provided, as can be seen more clearly in Fig. 1c. This overlap is caused by the mechanical production of the incisions by milling, in particular by their conical shape.

This results in overlap surfaces, which extend between the reading surfaces 5, 5' in the longitudinal direction 2, and overlap edges, which extend in the transverse direction 6, which may optionally facilitate scanning of the reading surfaces 5, 5'.

The reading surfaces 5, 5' are formed in the shape of recesses, i.e. incisions by milling, of the lateral surface 3 and have linear inlet bevels 7, 7' at the transition to the lateral surface 3 on both sides, as can be seen more clearly in Fig. 1c.

The reading surfaces 5, 5' are arranged offset from one another in the longitudinal direction 2. In the cross-section, the reading surfaces 5, 5' each have the shape of a sine curve; however, they are offset by an angle of about 90°. In the present exemplary embodiment, the sine curves each extend over a total angle of about 540°, i.e. three half-waves.

In this context, the angles refer to a distance in the longitudinal direction 2, wherein an angle of 540°, for example, may correspond to a distance of about 19 mm, measured from the respective ends of the linear inlet bevels 7, 7'. In other exemplary embodiments, the distance covered by the sine curves may be greater or smaller. The two sine curves each have a substantially identical amplitude and a substantially identical wave length. In the present exemplary embodiment, the amplitude of the sine curves is about 0.5 mm.

By selecting the sine curves this way, the sine curves in the present exemplary embodiment have three intersections, which are marked with the letters A, B and C in

Fig. 1b and may serve as scanning points 8. According to the invention, the scanning surfaces are scanned at these scanning points 8, wherein a scanning element is schematically shown in the form of a pin 12 with a scanning tip 13. The pin 12 is a core pin of a cylinder lock, which is known *per se* and the scanning tip 13 of which is adapted to the shape of the reading surfaces 5, 5' in the area of the intersection of the two sine curves by having correspondingly sinusoidal tip faces.

The corresponding cylinder lock is configured to lock when the pin 12 abuts the reading surfaces 5, 5' in their entirety.

Fig. 1c shows a detailed view of the tip of the key 1. It is clearly shown that the two reading surfaces 5, 5' of the code 4 are offset in the transverse direction, but with a slight overlap. In this exemplary embodiment, the overlap is caused during the production of the incisions by milling by a tool which creates recesses with a conical cross-section.

This is also shown in section G-G in Fig. 1e, which shows that the reading surface 5 is designed as the groove bottom of a conical incision by milling 9. This conical cross-sectional shape together with the sinusoidal depth of the incisions by milling 9, 9' is the reason for the wave-shaped course of the lower edge of the groove bottom, which is shown in Fig. 1c, and causes that the reading surfaces 5, 5' have a different width in the transverse direction 6, depending on their depth.

Fig. 1c also shows the inlet bevels 7, 7' of the reading surfaces 5, 5'. These inlet bevels 7, 7' are substantially linear and allow the scanning pin 12 to be easily inserted into the incision by milling. The sine curves start with the ends of the inlet bevels 7, 7', which are shown as having transverse edges, and each extends over three half-waves. In this exemplary embodiment, the entire length of the reading surfaces 5, 5' in the longitudinal direction 2 is about 19 mm, measured between the ends of the linear inlet bevels 7, 7'. In this exemplary embodiment, the width of the reading surfaces 5, 5' in the transverse direction 6 is about 1.5 mm each, wherein this is the width on the surface of the lateral surface 3, especially since the width of the reading surfaces 5, 5' on the groove bottom is variable.

Fig. 1d shows an embodiment of a system, comprising the key 1 and two scanning elements in the form of pins 12, 12', which are configured to scan the reading surfaces 5, 5' at the scanning positions A and C. In this exemplary embodiment, the scanning position B is not scanned.

Figs. 2a to 2e show a second exemplary embodiment of a key according to the invention as well as a system of a key according to the invention and scanning elements in the form of a sideshift 14. The reference signs used and the elements designated by them correspond to those used in the context of the exemplary embodiment according to Figs. 1a to 1e, except for the following differences.

In contrast to the first exemplary embodiment, a magnetic element 10, i.e. a permanent magnet, is arranged in the code 4, i.e. between the first reading surface 5 and the second reading surface 5'. In the longitudinal direction 2, the magnetic element 10 is located at one of the scanning points 8, namely scanning point A. This is shown in more detail in the sectional view E-E according to Fig. 2b and in the view of the key tip according to Fig. 2c. In exemplary embodiments not shown, a second magnetic element 10 may be provided at the scanning point B in order to facilitate a symmetrical introduction of the sideshift 14.

Further, Fig. 2b shows a detailed view of the sideshift 14, which - in contrast to the pins 12, 12' of the first exemplary embodiment - does not only scan individual scanning points, but, with its correspondingly shaped end face 15, is configured to scan the two reading surfaces 5, 5' in the area of the sine curve, i.e. between the inlet bevels 7, 7', in their entirety. Thus, errors in the sine curves also lead to a blocking of the lock if these errors occur outside the scanning points 8.

The form of the sideshift 14 is longitudinal in order to scan the sine curves over their entire length, and has a magnetic element 16, which is configured to cooperate with the permanent magnet in the code 4. It is thereby ensured that the sideshift 14 is attracted upon approaching the code 4 and that, thus, a minimal clearance does not cause blocking of the lock. However, the sideshift 14 is shorter than the entire incision by

milling of the reading surfaces 5, 5' since it only covers the area of the sine curves and not the area of the inlet bevels 7, 7', which are provided on both sides.

In contrast to the first exemplary embodiment, the length of the sine curves in this exemplary embodiment is only about 360°, i.e. two half-waves, so that only two scanning points 8 result, which are marked as A and B in Fig. 2b.

Further, Fig. 2c shows that the reading surfaces 5, 5' in this exemplary embodiment do not overlap along the transverse extension 6 of the key 1, but are directly adjacent to one another. This is achieved by using appropriate tools, e.g. embossing punches.

The magnetic element 10 is arranged centrally between the two reading surfaces 5, 5' in the transverse direction 6. Fig. 2e, which shows a section H-H, also shows that the incision by milling 9, which forms the reading surface 5, is not conical in this exemplary embodiment, but rectangular. Thus, in contrast to the first exemplary embodiment, no overlap surfaces result.

Fig. 2d shows a system of the key 1 with a sideshift 14, which comprises an end face 15, wherein the end face 15 is adapted to the shape of the reading surfaces 5, 5'.

Figs. 3a to 3e show a third exemplary embodiment of a key according to the invention as well as a system of a key according to the invention and scanning elements in the form of laterally arranged scanning pins. The reference signs used correspond to those used in the context of the exemplary embodiment according to Figs. 1a to 1e, except for the following differences.

In contrast to the first exemplary embodiment, the code 4 in this exemplary embodiment is not arranged on the broad side of the key 1, but on the narrow side of the key 1, i.e. the end face of the flat key shown.

Correspondingly, the transverse direction 6' is a direction orthogonal to the transverse direction 6 in the first and second exemplary embodiments.

Again, two reading surfaces 5, 5' are arranged offset from one another in the longitudinal direction 2, the respective cross-sections of which have the shape of a sine curve over an angular range of about 540° . The sine curves are offset from one another by an angle of about 90° in the longitudinal direction 2 so that three scanning points 8 result as intersections of the sine curves, which are marked as A, B and C in Fig. 3b.

Again, the two reading surfaces 5, 5' overlap, as can be seen in Fig. 3c, so that overlap surfaces are formed. Further, the reading surfaces 5, 5' are again formed as the groove bottom of a conical incision by milling 9 of the lateral surface 3, wherein the reading surfaces 5, 5' do not protrude beyond the outer cross-sectional profile of the key 1, as shown in Fig. 3e. In contrast to the exemplary embodiment in Figs. 1a to 1e, the code 4 in this exemplary embodiment is read not by conventional core pins, but by pins 12, 12', which are arranged angularly laterally along the broad side of the key 1/the keyway in the lock, which, however, also only scan scanning positions A and C, as schematically shown in Fig. 3d. Such laterally and angularly arranged pins for scanning codes located on the end faces of flat keys are known *per se* and allow to detect both the presence (positive test) and the absence (negative test) of respective codes.

In this exemplary embodiment, the amplitude of the sine curve may be considerably higher, e.g. 3 mm or 4 mm, than in the first two exemplary embodiments since incisions by milling on the end face of a flat key may usually be deeper than on the broad side of the flat key.

Figs. 4a to 4d show a fourth exemplary embodiment of a key 1 according to the invention with a combination of two codes 4 in the shape of incisions by milling and protruding material bars. The reference signs used correspond to those used in the context of the exemplary embodiment according to Figs. 1a to 1e, except for the following differences.

Fig. 4a shows the key 1 with its lateral surface 3, on which a code 4 is arranged in the form of two protruding material bars. Again, the material bars form reading surfaces 5a, 5a', which are offset from one another both in the longitudinal direction 2 and in the

transverse direction 6. Fig. 4b shows a view of the key from above and it can be seen that the material bars protrude beyond the cross-section of the key. The reading surfaces 5a, 5a' are shaped like the tip face or the ridge of a conical, protruding material bar 11, 11' of the lateral surface 3, wherein the reading surfaces 5a, 5a' protrude beyond the outer cross-sectional profile of the key 1. The overlap in the transverse direction and the conical cross-section is clearly shown in figures 4c and 4d, which shows a cross-sectional view along the line J-J in Fig. 4c.

In addition to the code 4, in which the reading surfaces are configured as material bars 11, 11', the key 1 according to this exemplary embodiment has a further code 4 (which is not shown in Fig. 4a and Fig. 4c), the reading surfaces 5, 5' of which are formed as the groove bottom of a conical incision by milling 9, 9' on the opposite lateral surface 3', wherein the reading surfaces 5, 5' do not protrude beyond the outer cross-sectional profile of the key 1.

Thus, in this exemplary embodiment, the design of the reading surfaces 5, 5' in the form of the groove bottom of an incision by milling is combined with the design in the form of the tip face or the ridge of a protruding material bar 11, 11'.

The scope of protection is not limited to the embodiments shown, but also comprises combinations of different embodiments. Thus, keys according to the invention may have multiple codes, which are configured differently on the narrow side and/or the broad side. Both the selection of the scanning points and the design of the curves are not limited to the embodiments shown. In particular, different shapes, amplitudes and period lengths of the curves may be provided, both for different codes and, within one code, for different reading surfaces. Further, more than two reading surfaces may also be provided in a code, which are then arranged offset both in the transverse direction and the longitudinal direction.

List of reference signs

1	Key
2	Longitudinal direction
3, 3'	Lateral surface
4	Code
5, 5'	Reading surface
5a, 5a'	Tip face
6, 6'	Transverse direction
7, 7'	Inlet bevel
8	Scanning points A, B, C
9	Incision by milling
10	Magnetic element of the key
11, 11'	Material bar
12, 12'	Pin
13	Scanning tip
14	Sideshift
15	End face
16	Magnetic Element of the sideshift

Claims

1. A key (1) for a cylinder lock, comprising at least one encoded lateral surface (3, 3'), which extends along a longitudinal direction (2) of the key (1),
 - a. wherein at least one code (4) to be read in the cylinder lock is provided on the lateral surface (3, 3'),
 - b. wherein the code (4) comprises a first reading surface (5), which extends in the longitudinal direction (2) of the key (1), and a second reading surface (5'), which extends in the longitudinal direction (2) of the key (1),
 - c. wherein the reading surfaces (5, 5') are arranged offset from one another in a transverse direction (6, 6') of the key (1),
 wherein
 - d. the reading surfaces (5, 5') are arranged offset from one another in the longitudinal direction (2), and
 - e. their respective cross-sections have the shape of a continuous and preferably periodical curve,
 characterized in that
 the curves are designed as sine curves or cosine curves, preferably over at least an entire period length.
2. The key (1) according to Claim 1, characterized in that the reading surfaces (5, 5') are offset from one another in the longitudinal direction (2) in such a way that the curves formed in the cross-section are offset from one another in the longitudinal direction (2) by an angle of preferably 45° to 135°, preferably about 90°, so that the reading surfaces (5, 5') intersect along the longitudinal direction (2) in two or more scanning points (8).
3. The key (1) according to Claim 1 or 2, characterized in that the curves have a period length of 4 mm to 25 mm, preferably 7 mm to 15 mm, particularly preferably 8 mm to 12 mm.
4. The key (1) according to any one of Claims 1 to 3, characterized in that the curves have an amplitude of 0.1 mm to 1.5 mm, preferably 0.3 mm to 1.0 mm, particularly preferably 0.5 mm to 0.8 mm.

5. The key (1) according to any one of Claims 1 to 4, characterized in that the reading surfaces (5, 5') are formed in the shape of recesses by milling or embossing the lateral surface (3, 3'), wherein linear or non-linear inlet bevels (7, 7') are optionally formed at the transition to the lateral surface (3, 3') on both sides.
6. The key (1) according to any one of Claims 1 to 5, characterized in that the code (4) is only provided in sections along part of a longitudinal extension of the key (1).
7. The key (1) according to any one of Claims 1 to 6, characterized in that a magnetic element (10) is arranged in the code (4), preferably along the transverse direction (6, 6') between the first reading surface (5) and the second reading surface (5') and preferably at one of scanning points (8).
8. The key (1) according to Claim 7, characterized in that the magnetic element (10) is arranged centrally in the longitudinal direction (2) along the reading surfaces (5, 5').
9. The key (1) according to any one of Claims 1 to 8, characterized in that the key (1) is a flat key, wherein the lateral surface (3, 3') is a broad side of the key and extends in a first transverse direction (6).
10. The key (1) according to any one of Claims 1 to 8, characterized in that the key (1) is a flat key, wherein the lateral surface (3, 3') is a narrow side of the key and extends in a second transverse direction (6').
11. The key (1) according to any one of Claims 1 to 10, characterized in that the codes on the lateral surfaces (3, 3') are identical so that the key (1) is a reversible key.
12. The key (1) according to any one of Claims 1 to 10, characterized in that the codes on the lateral surfaces (3, 3') are different so that the key (1) is a non-reversible key.
13. The key (1) according to any one of Claims 1 to 12, characterized in that the reading surfaces (5, 5') have an extension of 1 mm to 10 mm, preferably 1.5 mm to 3.5 mm, particularly preferably 2.0 to 3.0 mm, in the transverse direction (6, 6').

14. The key (1) according to any one of Claims 1 to 13, characterized in that the reading surfaces (5, 5') are designed as a groove bottom of a preferably conical or rectangular incision by milling (9, 9') of the lateral surface (3), wherein the reading surfaces (5, 5') do not protrude beyond an outer cross-sectional profile of the key (1).
15. The key (1) according to any one of Claims 1 to 13, characterized in that the reading surfaces (5a, 5a') are designed as a tip face or ridge of a preferably conical or rectangular, protruding material bar (11, 11') of the lateral surface (3), wherein the reading surfaces (5a, 5a') do not protrude beyond an outer cross-sectional profile of the key (1).
16. The key (1) according to any one of Claims 1 to 13, characterized
 - a. in that a first code (4) is provided, the reading surfaces (5, 5') of which are designed as a groove bottom of a preferably conical or rectangular incision by milling (9, 9') of a first lateral surface (3, 3'), wherein the reading surfaces (5, 5') do not protrude beyond an outer cross-sectional profile of the key (1), and
 - b. in that a second code (4) is provided, the reading surfaces (5a, 5a') of which are designed as a tip face or ridge of a preferably conical or rectangular protruding material bar (11, 11') of that or another lateral surface (3, 3'), wherein the reading surfaces (5a, 5a') protrude beyond the outer cross-sectional profile of the key (1).
17. A system of a key (1) according to any one of the preceding claims and a scanning element of a cylinder lock, characterized in that the scanning element is configured to read the code (4) in order to lock the cylinder lock.
18. The system according to claim 17, characterized in that the scanning element comprises a pin (12, 12') with a scanning tip (13), wherein the scanning tip (13) is adapted to the shape of the reading surfaces (5, 5', 5a, 5a') at the scanning points (8).

19. The system according to claim 17, characterized in that the scanning element comprises a sideshift (14) with an end face (15), wherein the end face (15) is adapted to the shape of the reading surfaces (5, 5', 5a, 5a').
20. The system according to claim 19, characterized in that the sideshift (14) comprises a magnetic element (16) in an area of its end face (15), the magnetic element being configured to cooperate with a magnetic element (10) of the key (1).