

Locking device with manipulation protection device and key

Description

The invention relates to a locking device, comprising a locking cylinder, a key and a manipulation protection device, wherein the locking cylinder has a cylinder core mounted in a housing, wherein a separating joint is formed between the housing and the cylinder core, according to the preamble of claim 1. The invention furthermore relates to a key, in particular for use in a locking device according to the invention.

Numerous keys or locking systems formed for the purpose of increased break-open security are known from the state of the art. From DE 699 04 408 T2, for example, a key having a movable pin as well as a rotary safety cylinder and a lock equipped with them are already known.

According to the solution therein, a key for a rotary safety cylinder is intended to be proposed, in which copying of a key equipped with it is made difficult by a movable pusher, and the user is given increased security.

Since criminals always keep on developing new ways with regard to the manipulation of locking systems, it is necessary to further develop keys or locking systems continuously. In particular manipulation protection devices for the purpose of drilling protection and/or pulling protection should therefore be further developed continuously.

From the aforementioned, it is a task of the invention to propose a further developed locking device which has a locking cylinder, a key as well as a manipulation protection device. Furthermore, it is a task of the invention to propose a further developed key which is in particular suitable for being used in a further developed locking device.

The solution of the task is performed in association with a locking device comprising a locking cylinder, a key and a manipulation protection device in accordance with

the feature combination according to claim 1. In association with a key, the solution is performed on the basis of the subject matter of claim 13.

The dependent claims comprise at least appropriate configurations and further developments.

Correspondingly, a locking device is taken as a basis comprising a locking cylinder, a key as well as a manipulation protection device, wherein the locking cylinder has a cylinder core mounted in a housing, wherein a separating joint is formed between the housing and the cylinder core.

The separating joint is formed such or has such dimensions that the cylinder core can be rotated within the housing during an opening process. Accordingly, and as a rule, not an over-dimensioned large gap is to be understood as a separating joint. Separating joints are often also referred to as separating planes.

According to the invention, the manipulation protection device has at least one protection pin, which is mounted so as to be displaceable in a protection pin channel, wherein the protection pin channel has a housing portion and a cylinder core portion.

In a blocking position of the locking device, the protection pin is arranged at least in certain portions in the housing portion in such a way that the separating joint is blocked. To achieve an opening position of the locking device, the protection pin can be completely displaced into the cylinder core and the separating joint can be released by virtue of at least one key inserted into the cylinder core and at least one magnetic element formed on or in the key shank of the key.

The blocking position of the locking device can also be a locking position of the locking device.

The manipulation protection device comprises the at least one protection pin, the at least one protection pin channel as well as at least one magnetic element formed on the key shank of the key.

The protection pin channel preferably is formed such that it is formed at least in certain portions within the cylinder core and at least in certain portions within the housing. The protection pin channel accordingly has a housing portion and a cylinder core portion. The housing portion and the cylinder core portion are aligned to one another in such a way that a continuous protection pin channel is formed. The housing portion and the cylinder core portion preferably are arranged to be flush to one another, so that the protection pin channel is created. Between the housing portion and the cylinder core portion, the separating joint is formed.

In a blocking position of the locking device, the protection pin is located at least in certain portions within the housing portion of the protection pin channel. Moreover, the protection pin in addition is formed within the cylinder core portion in the blocking position, so that the protection pin extends also beyond the separating joint and blocks it. Preferably, the protection pin is formed for the most part within the cylinder core portion in the blocking position. The cylinder core portion of the protection pin channel preferably is larger, in particular longer than the housing portion of the protection pin channel.

The blocking position of the locking device, on the one hand, relates to the completely closed state of the locking device, i.e. the state of a blocked lock. The blocking position further has to be assumed as long as the key has not yet been inserted completely into the key channel of the locking cylinder.

Due to the configuration of the locking device according to the invention, an effective manipulation protection device is provided so that the safety of a locking device can be increased.

The protection pin, for example, has a circular cross section. In a preferred embodiment of the invention, the protection pin is manufactured from steel. In a particularly preferred embodiment of the invention, the at least one protection pin is manufactured from hardened steel.

Furthermore, it is possible that the protection pin is substantially composed of two basic portions. The first portion preferably is that portion of the protection pin which is formed within the housing portion in a blocking position of the locking

device. A further or second portion of the protection pin substantially is located within the cylinder core portion in the blocking position of the locking device. The second portion may have a larger cross section than the first portion of the protection pin. Preferably, a magnetic element of the protection pin is formed in the second portion of the protection pin.

Preferably, the protection pin has such a shape that a position guidance of the protection pin is enabled due to the shape of the protection pin and the complementary shape of the protection pin channel.

Due to the magnetic element formed on or in the key shank of the key, the protection pin can be displaced. It is in particular possible that the protection pin is displaced, or in other words, pulled in the direction the magnetic element. Preferably, the protection pin will be pulled completely into the cylinder core so that the separating joint is no longer blocked and consequently is released.

Preferably, the cylinder core portion is closed towards a key channel of the cylinder core. The cylinder core portion of the protection pin channel, on the contrary, is open towards the housing portion so that the protection pin can be moved accordingly. Preferably, the protection pin channel thus is not accessible from the key channel. Directly manipulating the at least one protection pin from the key channel thus is not possible. Additional manipulation protection is derived from this.

Furthermore, it is possible that at least two protection pins are preferably formed. In this case, the at least two protection pins preferably have an identical magnetic polarity. It is possible that the at least two protection pins each have a magnetic element.

In a further embodiment of the invention it is possible that the protection pins themselves are formed as a magnetic element. The two protection pins preferably have a magnetic monopole or are formed as a magnetic monopole.

In the blocking position of the locking device, the formation of at least two protection pins having an identical magnetic polarity has the advantage that the two protection pins mutually repel. In the blocking position, the protection pins are thus

held in the housing portion of the respective protection pin channel due to the magnetic repellent force. It is possible that the magnetic repellent force acts as an additional force for holding the protection pins within the housing portion of the protection pin channel.

Preferably, the two protection pins are formed as a north pole and/or have a magnet with a north pole.

When two protection pins are formed, it is possible that a first protection pin is pretensioned by means of a spring, wherein the pretension acts towards the housing portion of the protection pin channel. For this purpose, the spring can be inserted into the cylinder core portion of the protection pin channel. The spring can rest upon a portion of the cylinder core that closes the cylinder core portion of the protection pin channel. Preferably, the spring is formed in an upper protection pin channel.

In the further protection pin channel, which preferably is the lower protection pin channel, no spring must be inserted since due to the downward orientation of the protection pin channel, the corresponding protection pin, due to the weight force, slides downward and thus towards the housing portion of the protection pin channel.

A key, in particular a reversible key interacting in particular with the locking cylinder, which has at least two protection pins of the same magnetic polarity, has at least two magnetic elements of an identical magnetic polarity.

The magnetic elements of the key, in particular of the reversible key, preferably have a polarity that is opposite to the magnetic polarity of the protection pins. The protection pins preferably have a north pole or are a north pole. The magnetic elements of the key preferably are each formed as a south pole.

By introducing the reversible key into the locking cylinder, the two protection pins, due to the first magnetic polarity, are pulled towards the magnetic elements which have a second polarity. Thus, the protection pins are both pulled towards the key, in particular towards the reversible key, so that the separating joint can be released.

The magnetic elements of the key preferably are formed as a magnetic monopole. In a particularly preferred embodiment of the invention, the magnetic elements of the key, in particular of the reversible key, are formed as a south pole.

The at least one magnetic element can be formed at an end of the key shank facing a key head. In other words, the magnetic element can be formed at an end of the key shank, which end points towards the key head or key grip.

Since the magnetic element preferably is formed such close to the key head or key grip, the protection pin can only be displaced into the cylinder core after the approximately complete insertion of the key shank into the key channel.

It should be pointed out that the protection pin does not interact with a coding element of the key. The at least one protection pin is in particular not an additional coding of a locking device. The protection pin exclusively serves to protect against manipulation, in particular to protect against drilling and/or to protect against pulling and/or to protect against percussion and/or to protect against picking.

It should be pointed out in particular, that the at least one protection pin is not a coding element. Known keys have mechanical and/or electronic encodings in the form of incisions and/or drilling recesses and/or electronic components. Also, the profile of the key itself serves as a coding.

These encodings are scanned in a locking cylinder. If the profile and the encodings of the key and the profiling of the locking cylinder coincide, the key can be inserted. If, moreover, the incisions of the key match, coding pins in the locking cylinder organize in such a manner that the core of the locking cylinder can be rotated. In summary, encodings are formed in known locking devices when incisions or drilling recesses are of different depth and/or are arranged at different locations on the key.

The locking device according to the invention can have further coding elements. The described protection pins, however, are not to be understood as a part of such coding devices.

In an embodiment according to the invention, the cylinder core is formed having a protection pin as described, wherein this pin forms a pulling protection element. This pulling protection element forms a form-fit connection between the cylinder core and the cylinder housing. The form-fit connection cannot be overcome with the help of mechanical aids, since the at least one protection pin is located in a closed protection pin channel as seen from the key channel. A direct contact to the pulling protection element (protection pin) is prevented. Since the pulling protection element (protection pin) furthermore can be configured as an anti-drilling protection, a further potential manipulation is made difficult.

The key of the locking device may be a cylinder key or a serrated key or a reversible key.

The at least one magnetic element preferably is formed in a coding-free, in particular drilling-free and or recess-free portion of the key shank. In other words, the magnetic element is formed in such a portion of the key shank that has no drilling and/or no recess.

The at least one magnetic element preferably is to be formed outside of notches or milled grooves for key encodings. Such a formation of the at least one magnetic element in a coding-free portion has the effect that no form-fit connection between the key shank and the protection pin is generated, and the key thus is still movable axially.

It is possible that on both of the key broadsides of the key shank at least one magnetic element is respectively formed. Preferably, the in this case at least two magnetic elements are arranged at equal distances from the key tip and/or from the spine of the key.

Alternatively, it is possible that at least two magnetic elements are arranged at different distances from the key tip and/or from the spine of the key.

In this case, it is possible that, for example, when only one protection pin is formed, the two magnetic elements can act upon said protection pin in an improved form, i.e. with increased force.

If two protection pins are formed, a clear separation with regard to the action of respectively one magnetic element upon one protection pin is enabled due to the formation of different distances of the magnetic elements from the key tip and/or from the spine of the key.

In a further embodiment of the invention, at least one magnetic element is formed in the spine of the key. In a particularly preferred embodiment of the invention, at least one first magnetic element can be formed in the spine of the key, and at least one second magnetic element can be formed on the side of the key shank opposite the spine of the key. Due to such a variable arrangement of at least one magnetic element, the protection pin, as well, can be mounted in variably oriented protection pin channels. If at least one magnetic element is formed in the spine of the key, it is preferably provided that the protection pins extends perpendicular to the longitudinal extension of the key shank.

The at least one protection pin can be mounted within the protection pin channel in a pretensioned state. In particular, the protection pin is pretensioned such that the protection pin is pressed towards the housing portion of the protection pin channel in a blocking position of the locking device. In a particularly preferred embodiment of the invention, the at least one protection pin can be mounted within the protection pin channel in a state pretensioned by a spring. Due to such a pretension force, the manipulation protection, in particular the drilling protection and/or pulling protection, is increased.

The at least one protection pin can be formed in a side of the locking cylinder facing a cylinder cover and/or a key channel opening. If the at least one protection pin is formed such close to the cylinder cover or protection rose or such close to the key channel opening, it is enabled that the protection pin can only be actuated after the almost complete insertion of the key shank into the key channel, and subsequently can be pulled towards the cylinder core portion of the protection pin channel.

In one embodiment of the invention, it is possible that the axis of the protection pin channel is formed in parallel to the longitudinal extension of the key channel opening. As the axis of the protection pin channel, the longitudinal axis of the

protection pin channel is to be understood. As the longitudinal extension of the key channel opening, the longest extension of the key channel opening cross section is to be understood. The axis of the protection pin channel and the longitudinal extension of the key channel opening thus are formed to be preferably parallel to one another.

Furthermore, the axis of the protection pin channel in this embodiment preferably is formed to be perpendicular to the longitudinal axis of the key channel. As the longitudinal axis of the key channel, the axis of the key channel is to be understood which defines the direction of movement or direction of insertion of the key shank.

In a further embodiment of the invention, the axis of the protection pin channel can be formed to be perpendicular, in particular at a right angle, to the longitudinal extension of the key channel opening, and perpendicular to the longitudinal axis of the key channel. This is in particular an advantageous embodiment of the invention, if the at least one magnetic element is formed in or on the spine of the key of the key shank.

It is possible that the manipulation protection device has two protection pins each mounted to be displaceable within a protection pin channel. The two protection pin channels preferably are formed to be in parallel to one another. In a particularly preferred embodiment of the invention, the two protection pin channels are formed to be in parallel to one another and substantially perpendicular to the longitudinal axis of the key channel.

In a possible embodiment of the invention, the two protection pin channels are formed to be in parallel to one another and substantially mirror-symmetrical to the longitudinal extension of the key channel opening.

As being substantially mirror-symmetrical, such an arrangement of the protection pin channels is to be understood in this case, which at most slightly deviates from the mutual parallel arrangement and/or with regard to the distance from a mirror axis. The formation of two protection pins, which can be actuated by means of magnetic elements of the key, in turn increases the manipulation protection.

Since the at least one protection pin can only be actuated when the key shank is almost completely inserted into the key channel, it can be ensured that the magnetic elements can only be effective when numerous standardized decoding operations have been performed before.

The key of the locking device according to the invention has known coding elements which firstly cause the movement of housing pins, for example, so that the key shank can be inserted bit by bit into the key channel, and when the key shank is almost completely inserted, an actuation of the protection pin and thus a release of the separating joint can be caused.

A further, in particular dependent aspect of the invention relates to a key which serves in particular for being used in a locking device according to the invention.

The key is in particular formed as a reversible key, wherein the reversible key has two discrete magnets having like polarity.

In the formation of a reversible key, two magnets independent of one another are necessary to enable a use in the locking device according to the invention, so that these can interact with the magnetic polarity of at least two protection pins.

The discrete magnets may be formed, for example, with the help of microcoils. In this regard, a battery could be arranged within the key head of the key according to the invention so that the microcoils can be actuated.

Furthermore, it is possible that the discrete magnets are formed by piezo elements.

In a particularly preferred embodiment of the invention, the discrete magnets each are formed as a magnetic monopole. Particularly preferred, the discrete Magnets are south pole magnets.

In a further embodiment of the invention, it is possible that the key is composed of two key halves. The separating line between the two key halves extends in this case from the key head up to the key tip, namely in the extension of the longitudinal extension of a corresponding key channel opening.

The two key halves each are magnetized.

The invention will be explained below in more detail by means of exemplary embodiments as well as with reference to schematic Figures.

Shown are in:

- Fig. 1a: a first embodiment of a locking device according to the invention in a blocking position;
- Fig. 1b: the embodiment according to the invention in accordance with Fig. 1a in an opening position;
- Fig. 2a: a second embodiment with regard to a locking device according to the invention in a blocking position;
- Fig. 2b: the embodiment in accordance with Fig. 2a in an opening position;
- Fig. 3a: a key of a locking device according to the invention in a perspective view;
- Fig. 3b: a longitudinal section through the key in accordance with Fig. 3a;
- Fig. 4a: a third embodiment with regard to a locking device according to the invention in a blocking position;
- Fig. 4b: the embodiment in accordance with Fig. 4a with a key inserted;
- Fig. 5a: a further embodiment with regard to a locking cylinder in a blocking position; and
- Fig. 5b: the embodiment in accordance with Fig. 5a with a key inserted.

The same reference numerals will be used in the description below for identical parts or parts of identical effect.

In the Figures 1a and 1b, a first embodiment with regard to a locking device 10 according to the invention is illustrated.

In Fig. 1a, the blocking position of the locking device is illustrated. In this case, no key is inserted into the locking cylinder.

In Fig. 1b, the key shank 52 of a key 50 is illustrated. The key shank 52 is in this case inserted in the key channel 32.

The locking device 10 comprises the locking cylinder 20, the key 50 and a manipulation protection device. The locking cylinder 20 in turn has a cylinder core 30 mounted in a housing 40. Between the housing 40 and the cylinder core 30, a separating joint 25 is formed. Due to the separating joint 25, the cylinder core 30 can be rotated within the housing.

Furthermore, the protection pin 35 can be recognized. The protection pin 35 is mounted in the protection pin channel 41 to be displaceable. The protection pin channel has a housing portion 45 and a cylinder core portion 46. The cylinder core portion 46 of the protection pin channel 41 is in this case formed within the cylinder core 30. The housing portion 45 of the protection pin channel 41, in contrast, is formed within the housing 40. The housing portion 45 and the cylinder portion 46 are arranged to be flush to one another so that the protection pin channel 41 is formed. It can be recognized that the housing portion 45 is considerably smaller than the cylinder core portion 46.

In the illustrated blocking position, the protection pin 35, too, is arranged within the housing portion 45 so that the protection pin 35 protrudes from the cylinder core portion 46 beyond the separating joint 25 into the housing portion 45. The protection pin 35 is formed in a portion of the locking cylinder 20 facing the cylinder cover 22 or the key channel opening 33. Accordingly, the protection pin 35 can only be actuated when the key shank 52 is inserted for the most part in the key channel 32.

As is illustrated in Fig. 1b, the key shank 52 is inserted in the key channel 32. The magnetic force of the magnetic element 60 acts upon the protection pin 35. The protection pin 35 is displaced or pulled towards the magnetic element 60. Therefore, the protection pin 35 is only located in the cylinder core portion 46 of the protection pin channel 41. The separating joint 25 is therefore no longer blocked by means of the protection pin 35, so that the cylinder core 30 is released and can be rotated.

In the Figures 2a and 2b, a second embodiment with regard to a locking device 10 according to the invention is illustrated, wherein this embodiment of the locking device 10 has strong correspondences with the embodiment in accordance with Figures 1a and 1b.

The only difference is the spring 28 formed in the protection pin channel 41, in particular in the cylinder core portion 46 of the protection pin channel 41. The spring 28 pushes the protection pin 35 towards the housing portion 45 of the protection pin channel 41. In the blocking position illustrated in Fig. 2a, the protection pin is thus pressed towards the housing portion 45 due to the spring force. This increases the manipulation security.

On the other hand, in Fig. 2b, the key shank 52 having the magnetic element 60 is inserted into the key channel 32. Due to the magnetic forces, the protection pin 35 is pushed towards the magnetic element 60. Thus, the spring 28 is compressed. The dimensions of the spring 28 as well as of the protection pin 35 should be selected such that both the compressed spring 28 and the protection pin 35 can be arranged completely in the cylinder core portion 46 of the protection pin channel 41 during the opening position of the locking device 10.

The separating joint 25 is released in the state illustrated in Fig. 2b so that the cylinder core 30 can be rotated within the housing 40.

In Fig. 3a, a key 50 of a locking device 10 according to the invention is illustrated. It can be recognized that the magnetic element 60 is formed at the end of the key shank 52 facing the key head (not illustrated) 51 or the key neck 56. In other words, the magnetic element 60 is formed at the end of the key shank 52 opposite the key

tip 53. The key shank 52 has milled grooves 58 at the key broadsides 55. Furthermore, coding elements 59 can be recognized on the spine of the key 54. The magnetic element 60 is formed on such a portion of the key shank that has no milled grooves 58 or coding elements 59.

As can be recognized in the longitudinal section in accordance with Fig. 3b; a magnetic element can be formed in any case at the side 57 of the key shank 52 that is formed opposite the spine of the key 54. In this case, the magnetic elements are formed at equal distances from the key tip 53. In alternative embodiments of the invention, it is conceivable that the magnetic elements are formed at the key broadsides 55 and are arranged at different distances from the key tip 53 and/or from the spine of the key 54.

In Fig. 4a, a further embodiment with regard to a locking device 10 according to the invention is illustrated. The key 50 there has a magnetic element 60 at both key broadsides 55, wherein only one key broadside 55 can be recognized in the present case.

On the other hand, the magnetic element 60 is formed at the end of the key shank 52 opposite the key tip 53. In Fig. 4a, it can be recognized in a partial sectional view, on the one hand, that the locking cylinder 20 has a cylinder cover 22. Furthermore, the protection pin 35 can be recognized. It is mounted in a protection pin channel 41, wherein it can be recognized in Fig. 4a that the protection pin 35 is arranged in the housing portion 45 of the protection pin channel 41. The separating joint 25 is thus blocked.

The axis A of the protection pin channel is formed to be parallel to the longitudinal extension LE of the key channel opening 33. On the side of the locking cylinder 20, which is not illustrated in a sectional view, a further protection pin having an associated protection pin channel (not illustrated) is likewise formed. The axis A of the protection pin channel 41 furthermore is formed to be perpendicular to the longitudinal axis L of the key channel 32.

In Fig. 5a, a further embodiment with regard to a locking device 10 according to the invention is illustrated. In Fig. 5a, no key is inserted into the key channel 32. Fig. 5a thus shows the blocking position of the locking device 10.

Two protection pins 35 can be recognized each being formed within a protection pin channel 41. The protection pin channel 41 and the cylinder core portion 46, respectively, are closed towards the key channel 32. For this purpose, a portion of the cylinder core 36 is formed between the key channel 32 and the cylinder core portion 46. The protection pins 35 thus cannot be accessed from the key channel 32.

The upper protection pin 35, i.e. the protection pin 35 formed above the key channel 32, is pretensioned by means of a spring 28. The spring 28 pushes the protection pin 35 upwards and thus towards the housing portion 45. In the lower protection pin 35, i.e. the protection pin 35 formed below the key channel 32, such a pretension is not necessary since the protection pin 35 slides downward towards the housing portion 45 due to the weight force.

It can be recognized that both protection pins 35 respectively have a first portion 37 and a second portion 38. The first portions 37 in particular serve for inserting the protection pin 35 into the housing portion 45. In order to enable a rotation of the cylinder core 30, the front sides 39 of the protection pins 35 each are chamfered.

The second portions 38 each are formed to be wider. The shape of the second portion 38 of the protection pins 35 moreover causes the pin 35 to be positionally guided within the protection pin channel 41, in particular within the cylinder core portion 46.

Moreover, magnets 34 are respectively formed within the second portion 38. The magnets 34 have the same magnetic polarity, in particular a north polarity. The magnets 34 and thus the protection pins 35 thus additionally repel from each other in the illustrated blocking position so that the protection pins 35, due to this repellent force, are additionally pushed into their respective positions into the housing portions 45.

It is furthermore illustrated in Fig. 5a, that the axes of the protection pin channels 41 extend substantially parallel to each another. Furthermore, the axes of the protection pin channels 41 are arranged to be perpendicular to the longitudinal axis of the key channel as well as perpendicular to the longitudinal extension of the key channel opening 33.

In Fig. 5b, the locking device 10 is illustrated with a key 50 inserted, which is in this case a reversible key.

The key 50 has two magnetic elements 60. The magnetic elements 60 have the same magnetic polarity. The magnetic polarity of the magnetic elements 60 of the key 50 is formed to be opposite with regard to the magnetic polarity of the magnets 34 of the protection pins 35. Consequently, the protection pins 35 and their magnets 34, respectively, are moved towards the key 50 during the insertion of the key 50 into the key channel 32. The pretension of the springs 28 as well as the weight force of the lower protection pin 35 are overcome due to the magnetic attraction. As a result of this, the separating joint 25 is released.

List of reference numerals

10	locking device
20	locking cylinder
22	cylinder cover
25	separating joint
28	spring
30	cylinder core
32	key channel
33	key channel opening
34	magnets
35	protection pin
36	portion of the cylinder core
37	first portion
38	second portion
39	front side
40	housing
41	protection pin channel
45	housing portion
46	cylinder core portion
50	key
51	key head
52	key shank
53	key tip
54	spine of the key
55	key broadside
56	key neck
57	opposite side
58	milled groove
59	coding element
60	magnetic element
A	axis of protection pin channel
L	longitudinal axis of key channel
LE	longitudinal extension of key channel opening

Claims

1. A locking device (10), comprising a locking cylinder (20), a key (50) and a manipulation protection device, wherein the locking cylinder (20) has a cylinder core (30) mounted in a housing (40), wherein a separating joint (25) is formed between the housing (40) and the cylinder core (30),
characterized in that
the manipulation protection device has at least one protection pin (35), which is mounted so as to be displaceable in a protection pin channel (41), wherein the protection pin channel (41) has a housing portion (45) and a cylinder core portion (46), wherein
in a blocking position of the locking device (10), the protection pin (35) is arranged at least in certain portions in the housing portion (45) in such a way that the separating joint (25) is blocked, and
to achieve an opening position of the locking device (10), the protection pin (35) can be completely displaced into the cylinder core portion (46) and the separating joint can be released by virtue of at least one key (50) that can be inserted into the cylinder core (30) and at least one magnetic element (60) formed on or in the key shank (52) of the key (50).
2. The locking device according to claim 1,
characterized in that
the cylinder core portion (46) of the protection pin channel (41) is closed towards a key channel (32) of the cylinder core (30).
3. The locking device according to claim 1,
characterized by
at least two protection pins (35), which have an identical magnetic polarity.
4. The locking device according to any one of claims 1 to 3, in particular according to claim 3,
characterized in that
the key (50), in particular a reversible key, has at least two magnetic elements (60), which have an identical magnetic polarity, wherein the magnetic

elements (60) of the key (50) preferably have a polarity that is opposite to the magnetic polarity of the protection pins (35).

5. The locking device (10) according to any one of the preceding claims, characterized in that
the at least one magnetic element (60) is formed at an end of the key shank (52) facing a key head (51).
6. The locking device (10) according to any one of the preceding claims, characterized in that
the at least one magnetic element (60) is formed in a coding-free, in particular drilling-free and/or recess-free portion of the key shank (52).
7. The locking device (10) according to any one of the preceding claims, characterized in that
on both of the key broadsides (55) of the key shank (52), at least one magnetic element (60) is respectively formed.
8. The locking device (10) according to any one of the preceding claims, characterized in that
the at least one protection pin (35) is mounted within the protection pin channel (41) in a state pretensioned in particular by means of a spring (28).
9. The locking device (10) according to any one of the preceding claims, characterized in that
the at least one protection pin (35) is formed in a side of the locking cylinder (20) facing a cylinder cover (22) and/or a key channel opening (33).
10. The locking device (10) according to any one of the preceding claims, characterized in that
the axis (A) of the protection pin channel (41) is formed to be perpendicular, in particular at a right angle, to the longitudinal extension (LE) of the key channel opening (33), and perpendicular to the longitudinal axis (L) of the key channel (32).

11. The locking device (10) according to any one of the preceding claims,
characterized in that
the manipulation protection device has two protection pins (35) each
mounted to be displaceable within a protection pin channel (41), wherein the two
protection pin channels (41) preferably are formed to be in parallel to one another
and particularly preferred to be substantially mirror-symmetrical to the longitudinal
extension (LE) of the key channel opening (33).
12. The locking device (10) according to any one of the preceding claims,
characterized in that
the manipulation protection device is a drilling protection and/or a pulling
protection and/or a percussion protection and/or a picking protection.
13. A key (50) in particular for being used in a locking device according to any
one of claims 1 to 12,
characterized by
a formation as a reversible key, wherein the reversible key has two discrete
magnets (60) having like polarity.
14. The key according to claim 13,
characterized in that
the discrete magnets (60) are formed by microcoils and/or magnetized key
material and/or by piezo elements.