

DEVICE FOR SAFEGUARDING A LOCK AGAINST MANIPULATION

DESCRIPTION

The invention relates to a safeguarding device for a lock against manipulation of the lock, said lock encompassing at least one locking element, which can be moved forward out of the lock through an opening in a faceplate of the lock into a locked position and which can be moved back into the lock into an open position.

Locks for doors, gates, windows and the like can be manipulated in that a manipulation object acts on the locking mechanism within the lock. The manipulation object can be inserted into the lock through the opening in the faceplate, because a gap is formed between the locking element and the door. In the event that a spring wire or preferably a spring sheet is used as manipulation object, the manipulation object can easily act on the push-back lock of the locking element, in particular on the locking bolt, in particular in the case of doors, which are not lock-seamed. In the event that the push-back lock of the locking element, for example a lock bolt or a lock striker plate, is released, it can be guided back into the open position of the lock, and a door can be passed through without authorization.

The gap between the locking element and the opening is created in particular in that a more or less large clearance fit is required between the locking element and the opening. The opening in the faceplate often serves as guide for the movable locking element, which can represent a lock or a catch bolt, for example. In addition, the clearance adaptation compensates for production tolerances of the individual components, whereby the gap can reach a lateral measure of 0.5 mm, for example.

Simple locks do not provide any safeguards against the possibility of manipulating the locking mechanism within the lock, so that they have low burglary protection ratings. Lock of higher quality encompass locking elements, which are embodied geometrically such that the gap between the locking element and the opening can be covered at least partially. For example, a locking element can encompass a locking element shaft comprising a smaller cross section and a locking element head comprising a larger cross section. In the transition between the locking element shaft and the locking element head, the locking element head can have a type of collar-like molding, which, however, complicates the production of the locking element considerably.

It is disadvantageous in particular that the locking elements, which are molded specifically with a safeguard against manipulation, must be produced extensively, for example by casting, embossing, reshaping or the like. The processing of the guide surfaces, which serve to guide the locking element in the opening of the faceplate, is complicated in particular by moldings for forming a safeguard against manipulation, because they are no longer plane across the entire surface. Typically, however, a reworking by means of machining is necessary, because guide surfaces, which are sufficiently smooth and true to size, can only be produced in this manner on the locking element. In the case of high-quality locks made of stainless steel, the reworking is simultaneously used for the surface refinement, e.g. by means of grinding, bowl glazing, polishing and the like, e.g..

It is therefore the object of the instant invention to create a safeguarding device for a lock against

manipulation of the lock, which can be produced in a simple manner and which offers a high degree of safety.

This object is solved based on a safeguarding device for a lock against a manipulation of the lock according to the preamble of claim 1. Advantageous further developments of the invention are specified in the dependent claims.

The invention includes the technical teaching that at least one safeguarding element is arranged on the locking element, so that a gap formed between the locking element and the opening is covered.

When, according to the invention, a safeguarding element is arranged on the locking element, the gap formed between the locking element and the opening is covered to the extent that a manipulation object can no longer be inserted into the lock through the gap. In the event that attempts are made to move a manipulation object through the gap, it strikes against the safeguarding element, and it is not possible to move the manipulation object further into the interior of the lock. According to the invention, the safeguarding element is embodied as individual component, which can be arranged on the locking element. The locking element can consequently be made of simple flat materials, wherein the reworking of the guide surfaces can be carried out by means of simple processing processes by means of machining, because they are flat across the entire surface, because moldings for forming a safeguard against manipulation cannot interfere with a flat processing.

The locking element can encompass a locking element shaft and a locking element head, wherein the safeguarding element is arranged in the area of the transition from the locking element shaft to the locking element head on the

locking element. The locking element head forms that part of the locking element, which can project forward out of the faceplate of the lock when the locking element is moved into the locked position. The locking element shaft forms that part of the locking element, which points in the direction of the inner side of the lock and with which the locking mechanism engages, so as to initiate the movement between the locked position and the open position into the locking element. In a particularly advantageous manner, the safeguarding element can be arranged at that location on the locking element, at which the locking element shaft transitions into the locking element head. For instance, this transition point is located on the rear side of the faceplate, when the locking element is moved forward out of the lock in the locked position. The safeguarding element is consequently also located on the rear side of the faceplate, and an access to the inner side of the lock through the gap is interrupted directly behind the faceplate, when the locking element is moved forward out of the lock for assuming the locked position.

The locking element shaft can encompass a smaller cross section than the locking element head and can form a locking element edge in the area of the transition from the locking element shaft to the locking element head, wherein the safeguarding element is brought to rest against the locking element edge from the direction of the locking element shaft. The cross section of the locking element can correspond to a rectangular cross section, and the rectangular cross section of the locking element head encompasses larger edge lengths than the edge lengths of the rectangular cross section of the locking element shaft. This creates a locking element edge comprising an edge surface, which extends at right angles to the direction of movement of the locking element. The safeguarding element can be brought to rest against this edge surface. For this purpose, the safeguarding element can encompass a passage,

through which the locking element and in particular the locking element shaft is guided. In a particularly advantageous manner, the safeguarding element can recreate the side ratio of the edge lengths of the rectangular cross section of the locking element, and a safeguarding element attached to the locking element forms a collar, which surrounds the cross section of the locking element.

Advantageously, the safeguarding element can at least partially and preferably completely surround the locking element, so that the gap between the locking element and the opening is covered across the entire periphery. A manipulation object can consequently not be inserted into the gap between the locking element and the opening in the faceplate from any side. In particular in the case of locking elements, which have a rectangular cross section, the safeguarding element can be designed such that the locking element is covered across its entire periphery. Such a safeguarding element encompasses a passage, through which the locking element consequently extends. A safeguarding element, which is arranged on that side of the locking element, which is oriented in the direction of a free door gap, attains a particular safeguarding effect.

According to a possible advantageous embodiment of the instant safeguarding device according to the invention, the safeguarding element can be locked into place on the locking element, can be clipped, screwed, welded, soldered, pressed and/or injected against the locking element by means of injection molding of plastic. To attain a further increase of the safeguarding effect against a manipulation, but to also attain a wear protection of the safeguarding element, which can serve as stop of the locking element against the inner side of the faceplate, the safeguarding element can be made of hardened steel.

The safeguarding element can furthermore be made of the same material, as the locking element itself. In addition, the safeguarding element can be made of a plastic material, which is injected against the locking element. For this purpose, the locking element can encompass accommodation geometries, so as to form a geometric form closure between the locking element and the injected plastic safeguarding element. However, the safeguarding element can in particular be attached mechanically to the locking element, wherein the connecting structure between the safeguarding element and the locking element is designed so as to be capable of being stressed to a sufficient extent, so as to avoid that the safeguarding element can be released from its position on the locking element by means of the manipulation object. The safeguarding element can be made of a sheet material by means of stamping-bending methods, or the safeguarding element is made by means of a metal die casting method.

The locking element of the lock comprising the safeguarding device according to the invention can be embodied diversely. For example, the locking element can be embodied as lock bolt and/or as lock striker plate of the lock. Routinely, a lock encompasses a lock bolt, which is moved between the locked position, which projects forward from the lock and the open position, retracted into the lock, via a locking cylinder. The lock bolt consequently serves to lock a door, without the door being capable of being opened only by means of a door handle. The locking element can also be embodied as a lock striker plate, which can be moved between the locked position and the open position by means of a handle according to a routine design of a lock,

wherein a movement of the lock striker plate can on principle also be carried out via a locking cylinder. For the most part, lock striker plates are pretensioned into the locked position by means of a spring element, wherein

locks are furthermore known, which lock the lock striker plate in the locked position by means of a locking cylinder so as to lock the lock, in that a push-back lock of the lock striker plate is activated. The safeguarding element according to the invention can be arranged on the locking element as lock bolt or as lock striker plate, regardless of the embodiment of the locking element.

The locking element can be moved linearly, moved rotationally or along a path in the opening in the faceplate. For the most part, linearly moved locking elements encompass a rectangular cross section and have an elongate extension, which can be divided into the locking element shaft in the inner area of the lock and into the locking element head, which can be moved forward out of the faceplate in the locked position. Locking elements, which are moved rotationally or which are moved along a path, which can swivel about a swivel axis, which is introduced in a stationary manner in the lock or which can be guided in a path, so as to reach out of the faceplate into the locked position, are furthermore known. According to the invention, the safeguarding element can be adapted to the design type of the locking element. The gap is covered in particular when the locking element is moved out of the faceplate in the locked position and the safeguarding element is adapted to the geometric shape of the locking element.

In the event that the locking element is embodied as a swivel bolt and can be rotated about a swivel axis in the lock, provision can be made for two safeguarding elements, which can be arranged laterally on both sides of the locking element from the direction of the swivel axis and which form a collar-like molding on the swivel lock. The safeguarding elements can be embodied in a bowl-like manner and can be arranged on both sides of the locking element such that the safeguarding elements surround the locking

element at least in the area, which also remains in the lock even in the locked position of the locking element. The bowl-like safeguarding elements thereby form a collar, which surrounds that part of the locking element, which projects forward out of the faceplate of the lock in the locked position. In this position, the collar formed by the safeguarding elements adjoins the faceplate of the lock on the inner side, so that the desired safeguarding against a manipulation of the locking mechanism within the lock is created.

The locking element can encompass an axle bolt, which extends in the swivel axis and which forms the mechanical accommodation of the locking element, which is embodied as swivel lock. The axle bolts can be embodied such that the safeguarding elements, which rest laterally against the locking element, form a structural unit with the locking element, and can only be released therefrom by overcoming considerable mechanical forces.

In particular, the collar-shaped molding of the safeguarding element on the swivel lock is created on the side of the swivel lock back, because the gap between the swivel lock and the faceplate of the lock is largest in the area of the swivel lock back. In the case of a swivel lock, which can be rotated about the swivel axis in the lock, said molding can form a constant gap with the constant distance of the opening, which does not change across the entire movement path of the locking element.

The locking element can further be embodied as swivel lock comprising a swivel lock back, wherein the safeguarding element is embodied as insertion element and is arranged on the swivel lock back. The insertion element can preferably be arranged on the locking element by means of material engagement or in a form closing manner, and can extend only

across the swivel lock back or the insertion element also surrounds the swivel lock at least in lateral direction as well.

According to yet a further advantageous embodiment, the safeguarding element can interact with an electric switching means, so that at least an identification of the locked position of the locking element is made possible by means of a control unit. The electric switching means can form a switch, for example, preferably a micro switch, with which the safeguarding element interacts mechanically, to activate the electric switching means. Information whether the locking element is in the locked position or in the open position, for example, can be transmitted to the control unit with this.

In an even more advantageous manner, the safeguarding element can strike against the faceplate on the inner side of the lock in the position when being moved out of the lock, wherein the safeguarding element is designed such that the safeguarding element creates a damping effect when striking against the faceplate. The advantageous damping effect can be attained in particular when the safeguarding element is made of a plastic material. The safeguarding element can furthermore encompass a plastic or rubber insert, which dampens an impact against the faceplate on the inner side. In the event that the locking element is moved into the locked position and in the event that it jumps into the locked position, in particular with the help of springs, a striking of the safeguarding element against the inner side of the faceplate can dampen in particular locking noises by means of a damping effect.

The object of the instant invention is furthermore solved by means of a lock comprising a locking element, which can be moved forward out of the lock through an opening in a faceplate of the lock into a locked position and which can

be moved back into the lock into an open position, wherein a safeguarding element is arranged on the locking element, so that a gap formed between the locking element and the opening is covered, so as to create a safeguarding device against a manipulation of the lock.

Further measures, which improve the invention, will be illustrated in more detail below together with preferred exemplary embodiments of the instant invention. In a schematic view:

Fig. 1 shows a perspective view of a locking element with an exemplary embodiment of a safeguarding element,

Fig. 2 shows a perspective view of an exemplary embodiment of a safeguarding element,

Fig. 3 shows a side view of the arrangement of a locking element in a lock in a locked position, which projects forward out of the faceplate,

Fig. 4 shows a locking element, which is embodied as swivel lock, and which encompasses two safeguarding elements according to a further exemplary embodiment and

Fig. 5 shows a further embodiment of a swivel lock in a lock, wherein a further exemplary embodiment of a safeguarding element is illustrated.

Figure 1 shows an exemplary embodiment of a safeguarding device according to the instant invention. A locking element 11, which is embodied as a lock bolt comprising a rectangular cross section and which is guided so as to be

longitudinally movable in an opening of a faceplate of the lock, is illustrated. The locking element 11 encompasses a locking element shaft 16, to which a locking element head 17 connects. The locking element shaft 16 forms that part of the locking element 11, which remains on the inner side of the lock, that is, behind the faceplate, in the open position as well as in the locked position of the locking element 11. On the contrary, the locking element head 17 projects forward out of the faceplate of the lock when the locking element 11 is moved into the locked position for locking a door, for example.

In the area of the transition from the locking element shaft 16 to the locking element head 17, a safeguarding element 14 is arranged according to the invention. The safeguarding element 14 is embodied as individual part and can in particular be brought to rest against a locking element edge 18, which forms the transition area between the locking element shaft 16 and the locking element head 17. The illustration shows a safeguarding element 14, which forms a collar-like border of the cross section of the locking element head 17. The collar thereby borders the cross section of the locking element head 17 across its entire periphery.

Figure 2 shows the safeguarding element 14 as individual part in a perspective view. To guide the locking element

shaft 16 through the safeguarding element 14, the latter encompasses a passage 19, which permeates the safeguarding element 14 in the center. The recess 25 shown in the safeguarding element 14 forms a depression in the safeguarding element 14, and the cross section of the locking element head 17 can be engaged with the recess 25 in the safeguarding element 14, so that the locking element edge 18 of the locking element 11 comes to rest against the bottom surface of the recess 25.

Figure 3 shows the arrangement of the locking element 11 in a lock 10, which is defined by the faceplate 13 on the front side. The locking element 11 is also embodied as lock bolt in this exemplary embodiment and can be moved linearly, wherein the direction of movement is suggested by a double arrow. In the cross cut view, the safeguarding element 14 is shown so as to rest against the locking element edge 18, which forms the transition between the locking element shaft 16 and the locking element head 17. The locking element 11 is shown in the locked position projecting forward out of the faceplate 13, and the safeguarding element 14 adjoins the inner side of the faceplate 13. A gap 15 is formed between the locking element head 17 and the opening 12 in the faceplate 13, wherein the gap 15 does not form a continuous area in the direction of the inner side of the lock 10, because it is interrupted by the safeguarding element 14. In the event that a manipulation object permeates through the gap 15 into the interior of the lock 10, the safeguarding element 14 will form a barrier, and the interior of the lock 10 is protected against a manipulation object. The safeguarding element 14 can be connected to the locking element 11 in different ways, preferably by means of material engagement or in a form closing manner. A welding 26, via which the safeguarding element 14 is attached to the locking element

11 by means of material engagement, is shown in an only exemplary manner.

A further exemplary embodiment of a locking element 11, which is embodied as swivel lock, is shown in Figure 4 in a perspective view. The locking element 11 is accommodated in the lock 10 so as to be capable of rotating about a swivel axis 20 and encompasses a plurality of plate-like elements, which form the body of the locking element 11 in a package

arrangement and which are connected to one another via bolts.

The swivel axis 20 is formed by means of an axle bolt 24, said axle bolt 24 being embodied as a screw element. According to the invention, provision is made for two safeguarding elements 14, which are arranged on both side of the swivel lock in each case from the direction of the swivel axis 20. The safeguarding elements 14 thereby form a collar-shaped molding 21, which extends in particular above the swivel lock back 22. The collar-shaped molding 21 is in each case also formed laterally of the part of the swivel lock, which is also located on the inner side in the lock 10 in the locked position of the swivel lock. The safeguarding elements 14 are embodied in a bowl-like manner and engage around the locking element 11 from lateral direction. The safeguarding elements 14 are screwed to the locking element 11 in a loss-proof manner via the axle bolt 24.

Figure 5 shows a cross cut view through a lock 10 in the area of the faceplate 13. The locking element 11 is also embodied as swivel lock and is supported in the lock 10 so as to be rotatable about the swivel axis 20. The opening 12, through which the locking element 11 can project forward into the locked position, is shown in the faceplate

13. The gap 15, which is formed in particular between the swivel lock back 22 and the upper side of the opening 12, is thereby created between the swivel lock back 22 and the opening 12. To interrupt this gap 15 as insertion channel for a manipulation object for impacting the locking mechanism, provision is made for a safeguarding element 14, which is embodied as insertion element 23. The latter is inserted on the side of the swivel lock back 22 and is welded or soldered in the swivel lock, for example. In the shown position, the swivel lock is in the locked position

and projects forward out of the faceplate 13. It can be seen thereby that the gap 15 is covered by the insertion element 23 in the direction of the inner side of the lock 10.

The embodiment of the instant invention is not limited to the above-specified, preferred exemplary embodiments. Instead, a number of alternatives is possible, which also uses the illustrated solution for embodiments, which are designed in a generally different manner. All of the features and/or advantages, including constructive details, spatial arrangements and method steps, which follow from the claims, the description or the drawings, can be essential for the invention either alone or also in the most varying combinations. In particular, the embodiment of the safeguarding element 14 can also be used as insertion element 23 in the case of locking elements 11, which are embodied as linearly moved locking elements 11 according to illustrations 1 and 3. Safeguarding elements 14 comprising a rectangular basic cross section and a central passage 19 can further be used for locking elements 11, which are embodied as swivel locks according to Figures 4 and 5.

List of Reference Numerals

- 10 lock
- 11 locking element
- 12 opening
- 13 faceplate
- 14 safeguarding element
- 15 gap
- 16 locking element shaft
- 17 locking element head
- 18 locking element edge
- 19 passage
- 20 swivel axis
- 21 collar-shaped molding
- 22 swivel lock back
- 23 insertion element
- 24 axle bolt
- 25 recess
- 26 welding

PATENT CLAIMS

1. A safeguarding device for a lock (10) against manipulation of the lock (10), said lock (10) encompassing at least one locking element (11), which can be moved forward out of the lock (10) through an opening (12) in a faceplate (13) of the lock (10) into a locked position and which can be moved back into the lock (10) into an open position,

characterized in that at least one safeguarding element (14) is arranged on the locking element (11), so that a gap (15) formed between the locking element (11) and the opening (12) is covered.

2. The safeguarding device according to claim 1, characterized in that the locking element (11) encompasses a locking element shaft (16) and a locking element head (17), wherein the safeguarding element (14) is arranged on the locking element (11) in the area of the transition from the locking element shaft (16) to the locking element head (17).
3. The safeguarding device according to claim 1 or 2, characterized in that the locking element shaft (16) encompasses a smaller cross section than the locking element head (17) and a locking element edge (18) is formed in the area of the transition from the locking element shaft (16) to the locking element head (17), wherein the safeguarding element (14) is brought to rest against the locking element edge (18) from the direction of the locking element shaft (16).
4. The safeguarding device according to one of claims 1 to 3, characterized in that the safeguarding element (14) encompasses a passage (19), through which the

locking element (11) and in particular the locking element shaft (16) is guided.

5. The safeguarding device according to one of the aforementioned claims, characterized in that the safeguarding element (14) at least partially and preferably completely surrounds the locking element (11), so that the gap (15) between the locking element (11) and the opening (12) is covered across the entire periphery.
6. The safeguarding device according to one of the aforementioned claims, characterized in that the safeguarding element (14) is locked into place on the locking element (11), is clipped, screwed, welded, soldered, pressed and/or injected against the locking element (11) by means of injection molding of plastic.
7. The safeguarding device according to one of the aforementioned claims, characterized in that the locking element (11) is embodied as lock bolt and/or as lock striker plate of the lock (10).
8. The safeguarding device according to one of the aforementioned claims, characterized in that the locking element (11) is moved linearly, moved rotationally or along a path in the opening (12) in the faceplate (13).
9. The safeguarding device according to one of the aforementioned claims, characterized in that the locking element (11) is embodied as swivel lock and can be rotated about a swivel axis (20) in the lock (10), wherein provision is made for two safeguarding elements (14), which can be arranged laterally on both

sides of the locking element (11) from the direction of the swivel axis (20) and which form a collar-shaped molding (21) on the swivel lock.

10. The safeguarding device according to one of the aforementioned claims, characterized in that the locking element (11) is embodied as swivel lock comprising a swivel lock back (22), wherein the safeguarding element (14) is embodied as insertion element (23) and is arranged on the swivel lock back (22).
11. The safeguarding device according to one of the aforementioned claims, characterized in that the safeguarding element (14) interacts with an electric switching means, so that at least an identification of the locked position of the locking element (11) is made possible by means of a control unit.
12. The safeguarding device according to one of the aforementioned claims, characterized in that the safeguarding element (14) strikes against the faceplate (13) in the position, which is moved forward out of the lock and is embodied such that the safeguarding element (14) creates a damping effect when striking against the faceplate (13).
13. A lock (10) comprising a locking element (11), which can be moved forward out of the lock (10) through an opening (12) in a faceplate (13) of the lock (10) into a locked position and which can be moved back into the lock (10) into an open position,

characterized in that a safeguarding element (14) is arranged on the locking element (11), so that a gap (15) formed between the locking element (11) and the opening (12) is covered, so as to create safeguarding device against a manipulation of the lock (10).